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The Massachusetts Medical Society.

PAPERS READ BEFORE THE ANNUAL MEETING OF THE SOCIETY, JUNE 9, 1920.

PREVENTIVE MEDICINE IN ITS RELATION TO SCHOOLS.

BY FRANK SPOONER CHURCHILL, M.D., MILTON, MASS.,
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THE keynote of this session of the Massachusetts Medical Society is "Prevention," and the old adage, "An ounce of prevention is worth a pound of cure," might well be taken as the text of our morning discussion. It reflects the trend of the times: Conservation and Prevention in all phases of modern life. In our own special field, of medicine, this trend is wide in its scope and seeks to protect the human individual practically throughout his life cycle: from the earliest possible time after conception continuously throughout the active part of his adult life. The trend is manifested by three active movements: Infant Welfare, Medical Inspection of Schools, Industrial Medicine. The first two are devoted to the care of infants and children—"Preventive Pediatrics"; the third concerns itself with adults.

Infant Welfare seeks to promote the health and development of the new individual by care of the pregnant mother during her pregnancy, labor, and confinement, by the care of the infant after birth up to two years of age, and recently by the more forward-looking organizations up to the fifth or sixth year.

Medical Inspection of Schools seeks the welfare of children by protection against contagious disease, by the promotion of good health and proper development.

Finally, Industrial Medicine seeks to protect men and women engaged in the manifold activities of our modern complex and intensive life by study of their bodies, fitting the individual to the job, and by the establishment of hygienic surroundings conducive to health and consequently to greater efficiency.

Thus modern medicine is seeking through these three comprehensive movements to promote the health and happiness of the human race, both as individuals and as communities. In all the movements the keynote is Prevention. This paper deals with the second movement, Medical Inspection of Schools, conceived of as a measure of preventive medicine.

Medical Inspection of Schools is of a two-fold nature: contagious and developmental. The movement started with the first as its objective and was an attempt on the part of the community to protect itself against contagious disease by exercising medical supervision of public schools, rightly recognized as the chief disseminators of such disease. It is thus communal rather than individual in its nature. Out of this first or contagious side of the subject grew the second or developmental part of the work. The latter is an attempt to promote the proper growth and development of the individual child during his school life by constant study and investigation of his body, and by the education of the child himself in the care of that body. It is individual rather than communal in its nature. The contagious side of school inspection is now thoroughly understood, is firmly established and has the hearty coöperation of home, school and government. The developmental side of the question, however, is not so well understood, nor is its importance generally appreciated by either home, school, the medical profession at large, or town and city governments. It is the purpose of this paper to discuss only the developmental side of school medical inspection, touching briefly upon its necessity and outlining a plan for its application.

The necessity for a more widespread and thorough medical inspection of schools is well known to those familiar with the physical condition of the young of our country. Exact knowledge as to this condition of the 22,000,000 schoolchildren of America is not available inasmuch as no comprehensive survey of large numbers of these children has ever been made; but that there is something radically wrong with far too large a proportion of them is now being realized, due, partly to the teachings of pediatricians and other workers in child-life, partly to the reports of the draft examinations in the war.

The pediatrician has known for years of the existence of large numbers of mal-nourished and under-nourished children whom he has encountered daily in hospital, dispensary, and even private practice. Recently he has had the opportunity of learning the "end-results" in some of these unfortunate children—an opportunity furnished by personal experience in the army and by draft reports already mentioned. Experience in the Medical Corps of the Army produced upon the mind of the pediatrician certain vivid impressions; perhaps the most striking of these was the acute sense of "too late," as he observed certain phenomena: in his own wards numerous troops with poor general development and marked physical defects; in the surgical wards, the reparative work of his surgical confreres; in the camp-at-large, the drilling in corrective exercises and gymnastics by "developmental" battalions. He recognized in these cases of mal-development, in these physical defects, the "end-results," the sequelae, of conditions remediable in early life. Then came the reports on the draft board examinations showing 35% or 40% of rejections on account of conditions which again he knew were present and remediable in early childhood. The constantly recurring thought was, "Too late. How did these thousands of youth arrive at this comparatively late age in such a physical condition? How prevent this in the future?" The answer was simple and obvious: Discover and correct these conditions in early childhood, or even in infancy. But how reach those millions in order to make any impression on the child-population at large? Again the answer was obvious: By organized effort, acting through agencies already at work on the problems of child-life, *viz.*, infant welfare, medical inspection of the schools. By the extension and more intensive application of these two movements to constantly widening fields throughout the country, it was conceivable that large masses of infants and children could be reached and studied, defects removed, proper development promoted; resulting ultimately in a more healthy and vigorous American stock to fight the battles of adult life, whether of war or more happily of peace.

We are concerned here only with the elaboration of a plan for the care of school-children. Such a plan must be broad and comprehensive in its scope, must be based on certain general principles. Its object being the care of the child's body throughout school life, it must provide, first for the study, and second for the development, of that body. It may provide for study of the body by repeated physical examinations; it may promote development by training the child in proper care of the body and by coördinating home and school influences. The plan thus involves physical examination, education, and organization.

1. Physical Examination: This examination seeks knowledge of the child's body, both generally and locally; generally, in regard to the nutrition as a whole, as manifested chiefly by weight and height; locally, with special reference to the condition of certain anatomical parts of the body, *viz.*, the eyes, ears, nose,

throat, teeth, glands, chest (external), heart, lungs, spine, and feet. It should be made upon all pupils at least once a year. In addition to this general examination of the school population as a whole, two groups of pupils need special investigation, *viz.*, the athletes, and the backward or defective children: the athletes to guard against over-exertion in the more violent sports, such as football, basket-ball, rowing and track; the backward children, to determine causes, if possible, and to classify.

The examination having been completed, abnormalities or defects, if present, should be reported to the parents, with the advice to consult the family physician for treatment and management. Two such reports are to be made: one, written, by the school physician; another, oral, by the school nurse in her "follow-up" work. Finally, the results of these examinations and reports should be recorded carefully, the records passed on from grade to grade with the rest of the pupil's school history, due weight being given to this particular part of his record as a whole in the matter of class-work, promotions, participation in sports and other school activities. The record for the complete school course, from kindergarten through high school, may be kept on one card and should cover the physical condition of the pupil from beginning to end.

2. Education: "Knowledge is Power." The education, taking the term in a broad sense, is necessary for both children and parents. With the child, it should consist of daily instruction in physiology, general hygiene, or certain principles of right living; with the parents it may consist of conferences, general and special: general conferences with groups of parents, such as Parent-Teachers' Associations, at which are discussed the general principles of school medical inspection, its aims and object; at which also, helpful criticisms and suggestions may be made. Special conferences over the individual child should be held, a "consultation" of home and school; the home being represented by the parents and family physician; the school by the principal, grade teacher, school nurse and school physician. (I have known personally excellent results follow such consultations.)

3. Organization: It is obvious that if the plan thus briefly outlined is to be carried out successfully, careful thought must be given to the arrangement of details. The general supervision of the work should be in the hands of a physician, preferably a pediatrician, as "medical director" or "school physician." The work is done partly within, partly without the school: "Intra-School" and "Extra-School."

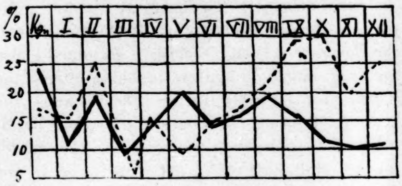
"Intra-School": The medical director must provide for the examination of the pupils and the keeping of the records. He should also take cognizance of matters touching closely the health of the pupils during school hours: the heating, lighting, ventilation of school buildings; the sanitary arrangements, the school lunches and playground activities; and in the capacity of consultant may render valuable help to the grade teachers, the teachers of physical training, of domestic science and to the dietitian, in their respective spheres.

"Extra-School": Here the medical director will find the success of his department dependent upon the spirit and attitude of the home, and his work greatly facilitated by the coöperation of certain community organizations.

The Home: It is of course vital to have the hearty and sympathetic help of the parents; they are and should be the final authority in deciding what shall be done to the bodies of their children, and in arriving at such decision they may be urged by the school to seek the advice of their family physician. The success of this part of the work depends largely upon the tact and general character of the school nurse and the way in which she does her "follow-up" work.

Community Organizations: The second "extra-school" agency which the medical director may use to attain results is the group of community associations now existent in all American cities and towns, associations moved by a civic conscience, with a desire to render social service to their fellows. They were in existence, of course, before the war, but their number was greatly increased and their civic spirit quickened by the war, and there is now happily a marked desire on the part of many of them still to "carry on" and to apply their energies to the problems of peace and reconstruction. The director of school medical inspection will find in these community organizations invaluable help in the discharge of his responsible duties. "Intra-School" they will supply "volunteer workers" who will assist him in the manifold details of the examinations; "extra-school" they will supply transportation for nurse and pupils: for the nurse in her house-to-house visiting; for pupils who must attend special clinics: eye, throat, dental, orthopedic or nutrition.

GRADES.



Curves showing grade by grade the percentage of boys (black line) and girls (dotted line) who are 10% or more below the average weight for their age and height.

The general principles of procedure thus briefly outlined have been carried out by me recently as medical director of schools in a suburban town. We have just completed our first year. The results have not been analyzed, hence a comprehensive report cannot be given at this time. It is possible, however, to give a brief summary as to the nutritional condition of the pupils studied. The total number examined is 1552; of these, 618, or 39%, are below the average weight of American children of corresponding age and height;* in most of these children the degree of nutrition is not severe; but in 262, or 16%, of them there is a marked condition of under- or mal-nutrition, 10% or more below the average weight. This latter group has been classified according to age and grade, the percentage or proportion to the whole grade calculated, and curves plotted on these percentages, separately for boys and girls (Chart 1). According to this chart, 17% of the girls and 24% of the boys enter the kindergarten to begin their school career handicapped by a considerable degree of mal-nutrition, at least 10% in weight below their average mates of the same age and height. From the kindergarten to the eighth grade, 10% to 20% of the children continue in this same group. The curves of boys and girls run fairly parallel up to the eighth grade. In this grade, at an average age of 14.1 years, the pupils enter the high school, and we note a sharp divergence in the curves of boys and girls: a marked drop in that of the boys; a considerable rise, to 30%, in that of the girls. The total number of both boys and girls examined, however, is small; furthermore, there has not been opportunity to inquire into causes; personal, social, or economic; consequently, no conclusions are justified. The figures are given merely as a matter of record.

The whole group of severely under-nourished children throughout the school system should receive intensive study, and plans for such study are now being formulated.

Dr. Thomas D. Hood of Columbia University informs me (personal communication) that the percentage of mal-nutrition given above do not differ much "from those which are found in other communities of good social standing." Such words from such an authority indicate a rather widespread state of mal-nutrition among our American school children, 22,000,000 in number. It requires but little effort of the imagination to see the connection between such percentages at these tender ages and those of the draft rejections. What are we going to do about it?

Preventive Medicine and Hygiene in Relation to Colleges.

By Roger I. Lee, M.D., Cambridge, Mass.,

Professor of Hygiene, Harvard University.

THE student population of a college or university represents a somewhat unique problem in regard to preventive medicine and hygiene. This population has somewhat unusual features. The students live largely in college dormitories. They eat in special boarding places. In their ordinary activities of work and recreation they are associated almost exclusively with fellow students. There are, to be sure, contacts with the outside world, but speaking largely, these contacts are occasional. We can regard the problem of preventive medicine and hygiene in colleges and universities as the problem of a very specialized community and, furthermore, of a community with a specialized industry. Looked at from that point of view the college community will have its own community problems and its own industrial problems. Probably all colleges and universities will present variations so they cannot be accurately contrasted with each other, although a comparison between colleges or between a college and another community or another industry will furnish data of considerable interest.

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* The standard of comparison is the Height and Weight Table for Boys and Girls, issued by the Child Health Organization of New York.

It is necessary at first to obtain certain statistical evidence from available data concerning college health, or rather college disease. Mortality statistics furnish the most positive as well as the most tragic data concerning the problems of disease and health. The mortality statistics in the undergraduate department of Harvard University for the period of the last ten years is as follows: On the basis of an approximate estimation of a college population for the ten years of 22,579, thirty-four deaths give a specific death rate per 1,000 of 1.8. As far as possible the deaths are recorded for an entire calendar year of any student registering at the beginning of the academic year. But for the basis of comparison, it is perhaps fair to estimate these deaths on a basis of an eight-months' year, which would give for a twelve-months' year a specific death rate of 2.7 per thousand. If we take the age group of fifteen to twenty-four, inclusive, in the city of Cambridge in a normal year, as 1914, we find that the estimated population in that age group is 20,400, the number of deaths is 76, and the specific death rate per 1,000 is 3.6, a figure considerably higher than that of the University students. There will of course come to the mind of everyone reasons why such a comparison is somewhat unfair.

It might be urged that the army statistics in peace times ought to offer a better basis of comparison with Harvard undergraduates. As is well known, the army does not accept men except those in good health. In 1915, the specific death rate in the army was 4.4, obviously greater than the University rates. This mortality of 4.4 divides itself into two sub-divisions, namely 2.5 who died from disease and 1.9 who died from results of injuries. On the same basis the Harvard death rates show 1.1 who died from disease and 1.7 who died from injury. In other words, there are similar death rates from violence, but the disease death rates are more favorable in Harvard College than in the army. In 1915, the death rate from tuberculosis in the army was .33 per 1,000, while in Harvard University the death rate for ten years was .13 per 1,000. This comparison is interesting because it indicates that the army physical examination for admission does not rule out the cases of tuberculosis in the army. On the other hand, the duration of life in tuberculosis is obviously long. Such cases are kept under treatment in the army and the college student with tuberculosis, provided he lives out one calendar year after registration, will not appear in the college statistics. In the case of pneumonia the army statistics for 1915 show a mortality of .31 per 1,000, while Harvard statistics for ten years show .53 per 1,000. The Harvard statistics are swelled by the inclusion of those cases who died in consequence of the influenza epidemic in 1918-19. The army figures show a much higher mortality rate in organic heart disease, measles, appendicitis, and cerebrospinal meningitis than the Harvard statistics.

The death rate among the undergraduates in Harvard University from the particular diseases is as follows: Pneumonia, .53; accidents, .35; tuberculosis, .13; cancer and malignant tumors, .08; heart disease, always in the form of acute endocarditis, .08; appendicitis, .04; meningitis, .04; mastoid, .04; typhoid, .04, and septicemia, .04. From the point of view of preventive medicine and hygiene, there are certain very interesting deductions that can be drawn. It is rather striking that malignant growths loom up as a cause of considerable mortality even among these young men. As far as we know, malignant disease is not preventable. From an ideal standpoint, the other conditions may be regarded as preventable. The cases of acute endocarditis developed upon chronic endocarditis. The students had chronic endocarditis at the time of entrance to the University, and prevention of this condition is obviously a problem of earlier life. The mortality in the case of meningitis, typhoid fever, mastoid disease, and appendicitis must be attributed to the inevitable mortality in association with those conditions. In ten years, as far as is known, the cases of typhoid fever which have occurred in the University have been contracted outside of the University. Here is an illustration of the effect of outside influences upon the mortality of a given community. In comparison with operations for appendicitis, the mortality from this condition is well under 1%, which may be regarded as fairly satisfactory.

However, the important causes of death are pneumonia and accidents which together comprise over half the deaths. Deaths from violence of one sort or another, including deaths from suicide, certainly loom large in this series. These regrettable deaths seem to be part and parcel of the circumstances of our present life and play an important rôle in mortality in the age group under discussion. In this respect the University statistics are somewhat similar to general statistics. Pneumonia has caused more deaths in the last ten years among Harvard undergraduates than all other causes combined. Our experiences with the influenza epidemics and the attendant pneumonias indicate that we have not at present the ability to prevent pneumonia or to prevent a rather definite mortality from pneumonia when it occurs. In the epidemic of influenza of 1918-19, the actual mortality of the cases of pneumonia was 10%. There were treated at the Stillman Infirmary 258 cases of influenza with 61 cases of bronchial pneumonia and of the 61 cases of bronchial pneumonia six men died. This mortality of 10% is certainly to be favorably contrasted to the usual recorded mortality of 30 to 50 per cent. This discussion of mortality rates among students would seem to show, first, that the actual number of deaths is small and that no single cause of death is conspicuous, and second, that under the University medical care of the sick no unusual disasters have occurred.

In discussing morbidity statistics, one is at once brought face to face with the fact that the commonest cause of illness among students which is sufficient to remove the student from his academic work is the group of upper respiratory diseases which are designated as colds, coryza, grippe, laryngitis, tonsillitis and influenza. During ten years an average of 632 students each year in Harvard College were unable to attend a period of at least two days of their college work on account of these upper respiratory infections. Of course in some instances the same student is counted twice, but approximately one out of every three students loses at least two days of his work on account of upper respiratory infections. Under contagious diseases are included chickenpox, diphtheria, measles, German measles, whooping cough, and scarlet fever. During one year there was a large epidemic of German measles, with no fatality; but with that exception the figures are relatively constant. On the average there are fourteen times as many absences on account of upper respiratory infections as those on account of the so-called contagious or quarantine diseases. In other words, there is an average of 45 cases of the so-called contagious diseases as opposed to 632 of the upper respiratory infections. It is generally believed that both these groups of diseases are transmitted in the same way, and have the same problems of prevention. In comparison with these two groups of diseases, the other causes of morbidity among students are relatively insignificant. There are, to be sure, various intestinal disturbances, and there are the results of accidents, etc., but the droplet infections remain the most important cause of students' absences.

This year we are collecting statistics concerning the amount of time lost by illness. The number of absences in terms of days run from 800 to 1700 per month. The number of days lost by illness this year reached its height in the early part of February, so that the month of February had 1682 student absences. In January, at the beginning of this year's epidemic of influenza, there were 1346 absences. On the basis of a calendar year, for slightly over two thousand students, we find an average loss of time for each student of seven college days per year. There are obvious defects in these figures, because it will be seen that the figures do not include the relatively more healthy summer months, but do include the relatively more unhealthy winter months. Furthermore, it may be argued and with a certain amount of justice that students will relinquish their college duties on a slighter pretext than a man might relinquish a money-paying job. It is to be remembered that this figure includes the total time of convalescence which tends to be longer in the case of students than it would be in an industrial worker. The figure, then, of seven days per student year is certainly liberal. However, it compares very favorably with army statistics and for other industries. When one faces the fact squarely it will be found somewhat difficult to suppose that any great improvement in these figures can reasonably be expected until there is a considerable improvement in the health of the community at large. It indicates very definitely however, that whatever measures are to be taken in order to yield actual results in the decrease of disease must be taken against the whole group of respiratory infections. It must be recognized that the contagious diseases are not as important either in number of students affected or in loss of time as that group of conditions designated as a cold, the grippe, etc.

Preventive medicine, however, is a broader term than the actual prevention of obvious disease. The war brought home to us very forcibly that an individual could be fit for certain industries, but not fit for the industry of war. The physical examination of young American manhood showed that approximately one out of three young men who came before the examining boards was declared unfit for military service. While a goodly proportion of the unfit was disqualified for the so-called organic defects, there was a large group which was disqualified because they did not meet the army requirements of physical fitness from a lack of care of the human body as a machine. For a number of years, we have been carrying out physical examinations at Harvard University. The number of men who are found with well-marked organic defects is surprisingly small. Under 5% have definite valvular disease of the heart, which is our largest group of organic disease. There is of course a considerable number of isolated cases of various defects. But speaking generally the students are organically sound. From the viewpoint of organic disease there is no conspicuous problem of preventive medicine. Our figures show that in less than 1% do we find in our physical examinations diseased tonsils which need to come out, or neglected teeth which need attention, or uncorrected eyes. We attribute this good showing to the effect of health propaganda of the last two decades. The greatest number of defects which we found, can be divided into two great classes: one, defective bodily mechanics, and two, a group of conditions which can best be described as nervous instability. From the point of view of physical examination in the college it would indicate that preventive measures should be directed particularly against bad bodily mechanics and nervous instability.

The frequency of nervous instability cannot be given in actual figures. It is certainly common in a college community as in every other community. This condition may be manifested by rapid heart action, unstable blood pressure, etc., at the time of the examination, or subsequently in the college course by a large variety of nervous ailments, many of which handicap rather than disable. One finds among college students usually, however, in less pronounced form, all the signs and symptoms of adult nervous instability. Likewise one finds the same ineffectiveness despite organic soundness. Since most college students are still plastic, it would seem possible to accomplish real benefit along preventive lines by correcting as far as possible nervous instability in the student population. I can recommend no panacea, but believe that wholesome daily habits will go far toward controlling this condition.

In our examinations of the bodily mechanics we classified not only the standing position but also the mechanical use of the feet. We have been much impressed in the work in college by the considerable number of students who before they leave college have difficulty with their feet or their backs, and of course this impression is substantiated by experience with adults among whom back and foot troubles are certainly common. In our examination we found that approximately 80% of the students may be regarded as having unsatisfactory bodily mechanics, either in regard to their backs or their feet.

Based upon the data already given, a program of preventive medicine and hygiene has been adopted in Harvard College. This program, which is required of the entire freshman class, has been an experiment put into operation for the first time this year. It is of course too early to speak with assurance of its success or failure. A series of some twenty lectures on the general subject of hygiene has been given to the entire freshman class. These lectures have covered what might be called the fundamental principles of general hygiene. The lectures are designed to supplement the physical examination, the advice of the medical office at the University, and the individual conferences with one of the University physicians. In these lectures are discussed such points as bodily mechanics, exercise, rest, food, hereditary influences, ventilation, and the infectious diseases. In the course of the lectures on the infectious disease the venereal diseases are discussed not as a feature but as information which intelligent people should have. In addition to these lectures which students in the freshman class are required to take, a minimum of physical exercise of at least one hour three times a week is required. We aim to give each member of the freshman class the habit of exercise under supervision. The student is quite at liberty to choose his own form of exercise with the exception that he must know how to swim, and if his bodily mechanics are very unsatisfactory he must receive for a short period intensive training in that subject.

Each freshman receives a varying amount of advice at the time of his physical examination. If he presents at that time any defects, he is followed up and may be kept under frequent observation all through this college course.

For the upper classmen there are no set requirements. The upper classmen have all been examined physically, and general supervision is kept over their physical welfare. There is every encouragement made for the indulgence in physical recreation, but there is no requirement made in that regard. For the upper classmen there is an elective course in informational hygiene which is designed to give to the group of college men such information concerning hygiene as men of affairs would seem to require. For the upper classmen also there are the opportunities for conferences on health in addition to the opportunities to obtain medical advice when they are ill.

Like any other community or industry there are, of course, the usual sanitary problems in a university. In Harvard University there is a sanitary inspector who is a member of the staff of the Department of Hygiene. He is usually one of the junior men of the Department of Sanitary Engineering. He is responsible for periodic examination of food, etc., at the college dining halls. Various individuals who handle food are of course subject to medical examination. The Department of Hygiene has supervision of the sick students and in any event is always informed of all cases of illness. Consequently data are constantly available for the adoption of special preventive measures.

From the data here presented, it would seem that the health of the college community must be attacked along lines similar to other communities. There are no particular hazards and no particular diseases inherent in college life. While it cannot be stated in exact figures, yet there is adequate information so that we know the venereal problem at the present time at least is certainly not an important problem in the life of the college community with which I am familiar. It would appear, furthermore, from a study of the data in this paper that the application of preventive medicine must needs be along the lines of what is perhaps best called health habits. Isolation and quarantine, while of course of value in upper respiratory disease and the so-called contagious diseases, do not seem to be particularly fortunate in eliminating those diseases. If we are to reduce the instance of the upper respiratory diseases which cause the large bulk of illness among students, we must secure the adoption of proper health habits on the part of the members of all communities including the student communities.

Furthermore, if we are to increase bodily efficiency, if we are to reduce the number of those unfit for military service below the rather striking figure of approximately 40%, we must persuade the youth of the country to take adequate care of their bodies throughout the year and not merely to be interested in their bodies when they happen to be ill. The intelligent care of the body demands a certain amount of information in regard to it which may well be given in lectures on the general subject of hygiene; and, furthermore, it demands a reasonable amount of physical exercise. I am not pleading for a course in competitive athletics, but merely for an adequate amount of bodily exercise to maintain reasonable body fitness. Good bodily mechanics and exercise are after all only two closely related health habits. An adequate amount of rest, proper food habits, and many others are equally essential.

Moreover, it is only by wholesome health habits that we can expect to diminish the nervous instability of the people at large. It is certainly not my impression that college students are any more nervously unstable than the rest of the world. In fact I am inclined to believe that the contrary is the case. There are correspondingly more suicides in the country at large than in the college population, but the occurrence of suicides in college and the occurrence of the signs of nervous instability should induce us to attempt preventive measures, wherever possible, against this condition.

It would seem that while our standard methods of preventive medicine with which we are all familiar can of course be greatly perfected, nevertheless, not much more is to be expected of them. Already, in consequence of competent medical advice, there is only an occasional inevitable death from such conditions as appendicitis, mastoid, etc. At the present time local sanitary inspection and public health measures largely guarantee the purity of water and milk and tend to eliminate typhoid fever. It is for these reasons that I suggest strongly that more emphasis should be laid upon instruction in hygiene and the systematic endeavor to attempt to establish in the population of all communities adequate health habits.

THE GENERAL MANAGEMENT OF HEALTH IN INDUSTRY.

BY W. IRVING CLARK, JR., M.D., WORCESTER.

IN every factory there are two distinct products: that of the machine and that of the worker. Together they are represented by the finished article. Neither can be separated from the other, for the machine which produces the article cannot work without the labor of the man who controls the machine. Thus in production there are two equally important factors at work—the man, and the work of the machine.

The machine has always received due care but up to ten years ago little attention was paid to the physical condition of the worker. The vital importance of the health of the worker is now fully recognized from an economic as well as a humanitarian point of view, and there is hardly a large factory in the country which has not now a well equipped medical department.

The industrial physician must be well trained not only in medicine but factory management, because of the intimate contact between his work and that of the other departments. He must know thoroughly the working conditions in the factory and the types of machine operated, in order to understand the accident and health hazards present.

The responsibility of the industrial physician is similar to that of the army surgeon. Both have the health and welfare of a large number of men under their control, both have problems of preventive as well as curative medicine and surgery constantly before them.

The industrial physician must see that work is carried on in an environment compatible with health. This means that all sanitation is under his control and that he must be familiar with the problems of maintaining adequate ventilation, heat, lighting, and atmospheric conditions. He must know the physical condition of each worker who enters the employ of the company. This is accomplished by a complete but rapid physical examination lasting not more than five minutes. The examination is made of the stripped applicant, and those who show any abnormal condition are set aside for a more complete examination after the rush is over. Unless an examination is made rapidly, men are held too long and the smooth running of the Employment Department interfered with.

He must see that all defective workers are properly placed. It is seldom that it is necessary to reject a worker because of his physical condition. Rejections are made only when a man's physical condition makes his working in the factory a menace to himself, to others or to property.

He must follow up all defective workers and see that they are not suffering from the effects of their work. This is done by a follow-up system calling for the regular reëxamination of defective workers at stated periods.

He must diagnose all cases of sickness in the factory and give advice and simple emergency treatment to those requiring it. The function of the industrial physician is not to treat medical cases. The treatment should always be carried on by the family physician or at a hospital, but he must give simple emergency treatment and a great deal of advice. A most important duty is the instruction of men needing care to go to a doctor outside the factory. He must study the hazardous processes and reëxamine frequently all workers exposed to poisons of industry. He must prevent the spread of contagious disease by early diagnosis, isolation and, when possible, by preventive inoculation. He must diagnose and treat all cases of accident occurring among the workers and endeavor to return the injured to work at the earliest moment, advising the employment manager as to the type of work desirable. This is an effort to duplicate the reeducational work of the army.

The industrial physician must coöperate with all other departments in order that his work may be effective. He must arrange his work so as to interfere as little as possible with production, and must always remember that production is the life of the factory.

If these responsibilities are earnestly met and carried out the effect upon the health of the workers is definite and reflected in better work, increased morale and a definite reduction of time lost from sickness and accident. The medical profession has in industrial medicine an opportunity for research work which does not exist elsewhere. Organized medicine in the hospital sees only advanced pathological conditions, even the general practitioner is not called in until the symptoms of disease have become marked. In the case of the industrial medical department, however, organized medicine with good equipment is provided with large numbers of cases of beginning as well as advanced disease and provides in its dispensary an opportunity to study the earliest types of pathological processes. The fact that in the majority of cases the patient can be summoned by telephone for any examination desired at five minutes' notice, and that cases can be followed for years offers an exceptional opportunity for study.

Unfortunately, the industrial physician finds so much of his time taken up by the routine of his work that little has as yet been published; however, work along these lines is going on slowly and we hope eventually many new things may come from this very interesting field.

THE CONTROL OF VENEREAL DISEASES.

BY GEORGE GILBERT SMITH, M.D., F.A.C.S., BOSTON.

MANAGEMENT of the venereal disease problem, complicated though it is by many factors, is nevertheless simple enough in one respect. Contagion is, for all practical purposes, by personal contact. Tuberculosis may be spread through the agency of dust; scarlet fever is often milk-borne; typhoid bacilli may pollute the water supply of a city. The venereal diseases are spread from one individual to another, in the vast majority of cases by the sexual act.

In considering this problem it would seem permissible to ignore the less frequent methods of infection; if infection through sexual contact could be done away with, there would be no fear of contagion by other methods.

Viewing the question as a whole, it would appear that there are two points of attack. One is the prevention of infection of the individual; the other is the cure of the carrier of infection. Either end alone, if it could be consummated, would eradicate venereal disease. Since neither is likely to be achieved, we must, so far as is possible, try for both.

Prevention of Infection. The greatest safeguard against infection is chastity. There is today, so far as I know, no real opposition by medical men to the statement that in the great majority of instances, continence is perfectly compatible with health of body and vigor of mind. This doctrine should be taught widely, especially to boys between the ages of 12 and 21. Early instruction bites deep, and helps to form convictions which will stand against the assaults of later life.

It is futile, however, to act upon the assumption that even a large minority of boys will reach the age of 25 without having had sexual experiences. Only comparatively few will do that. To increase the number of these and to exercise at least a slight check upon the sexual activities of others, constitutes one definite aim. It is an act of justice, no less than one of self-preservation, that society should allow no boy or young man—indeed, no girl—to enter into promiscuous sexual relations without having a clear knowledge of the danger to which he or she is exposed.

Education is, therefore, the foundation of all progress against venereal disease. Its object is to acquaint every young person with the fact that continence is not harmful; that the sexual phase of life should be reserved for one man or one woman; that promiscuous intercourse may be the means of ruining one's health, of unfitting one for marriage, and of infecting those who are dearest to our hearts. Education should begin at least as early as puberty; it should be scientifically, not emotionally, presented, and above all should not contain exaggerations. There is not time to go into the various modes of education in any detail. Sufficient to say that whenever education along these lines is offered, it is always eagerly received. The field for dissemination of knowledge is vast,—boys' clubs, Y. M. C. A.'s, factories, and schools. Often more can be done by teachers and gymnasium instructors, for instance, through personal example and a few well-directed words. The time to strike is in youth; later, when a man's habits are formed, conversion is difficult. If a man who has reached years of discretion chooses to jeopardize his health, his family life and his career by sexual indulgence, it is more or less his own lookout. For immature youth to be allowed to embark upon such perilous adventures while not yet awake to their dangers is a crime.

Prevention at the source, so to speak, is furthered by lessening the opportunities for sexual irregularity. Young people should have every facility for wholesome recreation. It is from this point of view, to my mind, that prohibition really is a good thing. There is no doubt but that drinking, and places where drink was sold, were most potent factors in increasing the number of sexual exposures, and in making careless those who otherwise might have been too fastidious or too cautious to indulge. You have all known such instances. The father of a family, drinking with business associates, carried off his feet while intoxicated; the student, dining and wining "like a man," infected by some cafe habitué; most pitiful of all, the girl who trustfully lowers her inhibitory faculties by drinking with a man whom she does not really know.

Liquor, prostitution, and venereal disease are great allies. The removal of the first two from the path of youth will be of great help in getting him past the third.

Personal Prophylaxis. Opinion is divided as to the place of personal prophylaxis in the fight against venereal disease. Not that anyone doubts the efficacy of venereal prophylaxis when properly administered. The tremendous decrease in venereal disease in the United States Army—the number of non-effectives from this cause decreasing from 23.23 per 1,000 in 1909, when prophylaxis was instituted, to 4.44 per 1,000 in 1916, proves its value. Riggs has shown that if prophylaxis is employed within one hour after exposure, the failures are less than 0.1%; if used during the first four hours, they are less than 1%. Among 100,000 prophylactic treatments administered at Bordeaux, the failures were 1.7%.

Basing their position upon the proved efficacy of personal prophylaxis, the Society for the Prevention of Venereal Disease, which was established in England about one year ago, advocates the wide dissemination of knowledge as to the use of the prophylactic packet, and believes that, inasmuch as man will be sexually promiscuous anyway, the best weapon against disease is prophylaxis. The State of Pennsylvania, according to their Assistant Commissioner of Health, also advocates this measure.

The adaptation of the army prophylaxis station to civil communities does not seem to be feasible. The difficulty of securing competent attendants and the cost of keeping such stations open day and night are two very real objections. In addition to the practical obstacles in the way of establishing prophylactic stations, there are also the more theoretical objections against advocating either of the methods of prophylaxis. The Federal Division of Venereal Diseases and the Massachusetts Board of Health do not mention them in their program; the American Social Hygiene Association has no personal prophylaxis plank in its platform. The Interdepartmental Commission appointed in England to consider the danger of dissemination of disease following demobilization expressed their belief that "The official application of a packet system to the Civil Community is neither desirable nor practical." The Public Health Commission of the London County Council holds that the value of prevention will be offset by the increased number of exposures brought about by the feeling of safety which prophylaxis would engender.

After all, is there not a certain incongruity between advising continence in one paragraph and in the next describing a method of prophylaxis? Prophylaxis, from the individual's point of view, is all right. If he is going to expose himself, let him by all means do what he can to prevent evil consequences. From the point of view of the campaigner against venereal disease, it is all wrong. The open advocacy of prophylaxis takes a good deal of weight from the advice against sexual promiscuity, and suggests to the listener that these teachings are insincere.

The Cure of Carriers. There can be no division of opinion as to the desirability of cleaning up the carriers of venereal disease. Here again the process must ultimately go back to the individual and to his state of mind as regards his infection. If he is satisfied merely with a cessation of the more pronounced symptoms of his malady, no amount of legislation and congressional grants will force him to continue treatment after that point is reached. Education is, therefore, also a requisite here. The youth of the country must be taught the absolute necessity of the thorough treatment of venereal disease, and the danger of its remaining latent, but potentially dangerous. It might not be amiss to include among those who need education along this line, the doctors themselves. I am inclined to think that syphilis, if recognized, is more thoroughly treated than is gonorrhea. A man either treats syphilis or he doesn't treat it; if the former, he cannot have failed to have imbibed, along with the newer methods of treatment, some idea of the proper amount of treatment to give. On the other hand, any practitioner can give a prescription for use in urethritis; if the discharge ceases, well and good, no matter how many gonococci the prostate and vesicles may harbor. There seems to be, with certain doctors, a sort of unwritten law against rectal examination and prostatic massage.

A realization of the seriousness of venereal infection is one thing; the means to cure it is another. There must be facilities for treatment,—not small facilities, grudgingly provided, but facilities so good that their very excellence proves the importance of the end which they serve. One may ask why the sufferers from venereal disease should be treated so well, when other and worthier sick have to get along with less. I say, because Society is seeking a larger end than that of the health or the happiness of the individual. We endeavor to cure the sufferer from venereal disease, not for his own sake alone, but for the sake of all with whom he comes in contact. It does no good to point to excellent clinics run in the morning when nine-tenths of the sick cannot afford to leave their work to attend them. I should like to see the establishment of a free Board of Health Clinic, open in the evening or the late afternoon, with a salaried medical staff. The State would save money in the long run.

I have tried to show that the question of control of venereal disease rests upon, first, the prevention of infection in the individual; second, the cure of those who, in spite of the first provision, do become infected. Let us see what is really being done.

In July, 1918, spurred into action by the needs of the war, Congress created a Division of Venereal Diseases within the Department of Public Health. The same Act created the Interdepartmental Social Hygiene Board, composed of the Surgeons General of the Army, Navy, and Public Health Service. Four million dollars was appropriated for the next two years. Of this, one million dollars was allotted on a per capita basis to those state boards of health which fulfilled the regulations of the Secretary of the Treasury. These regulations included the following points:

1. Syphilis and gonorrhea must be reported.
2. An officer of the Public Health Service shall be assigned to each state receiving the allotment, to coöperate with the state health officer in supervising venereal disease work in the state.
3. The allotment itself shall be expended on standard lines: 10% being assigned to administration, 50% to treatment, and 20% each to repressive and educational measures.

To receive an appropriation for 1919-20, each state had to appropriate a sum equal to that received from the Federal Government.

Thus the campaign is directed from a central bureau in Washington, which coöperates with each state board of health. The State Board of Health is assisted by an officer assigned from the Federal Division of Venereal Disease who serves to keep the two bodies in contact with each other. The State Board of Health works with the medical profession of the state and endeavors to build up their coöperation.

The State Board of Health provides medical centers—there are 16 in Massachusetts—where diagnoses may be made, venereal disease treated, and the local members of the medical profession trained in the management of venereal disease. The doctors are required to report to the Board of Health by number only each case of venereal disease, and to give the State Board the patient's name and address in case he or she fails to follow up the treatment. Information as to the existence of "carriers," such as clandestine prostitutes who are spreading disease, is requested by the State Board.

These are the salient measures. In addition, there are the more diffuse but no less important educational measures. Lectures, exhibits, pamphlets, placards, and films are slowly undermining the fabric of ignorance and false modesty, the erection of which began before the venereal diseases were differentiated. Through education the laity is being taught the practical value of chastity and the seriousness of venereal infections; through education is being taught the need for thorough treatment if infection has occurred.

C. C. Pierce, Assistant Surgeon General of the Public Health Service, in speaking of the obstacles to the campaign against venereal disease, considers the greatest obstacle to be the reluctance of a certain percentage of practicing physicians to participate whole-heartedly in the program for venereal disease control. It seems inconceivable that the very men who see most clearly the ravages of venereal disease should oppose the measures taken to control this plague. "Conservatism" is the answer, no doubt, yet it furnishes no excuse.

A movement, nation-wide, backed by Congress with its power of appropriation, initiated by the Division of Venereal Disease with a determined, yet rational policy, is under way. Results may not appear at once, but, in my belief, some of us may live long enough to see established a practically complete control of venereal disease.

MENTAL HYGIENE.

BY WALTER E. FERNALD, M.D., WAVERLEY, MASS.

MENTAL health is as important to the individual and to society as is physical health, and it is fitting that mental hygiene should have a place in a symposium on general hygiene and on other phases of special hygiene.

The aim and purpose of mental hygiene, as defined by the Massachusetts Society for Mental Hygiene, is to work for the conservation of mental health; to help in raising the standards of care for those suffering from or in danger of developing mental disease; to promote the study of mental disease in its various forms and varieties; and to disseminate knowledge concerning its causes, treatment and prevention.

In other words, mental hygiene means the correlation and application of all available knowledge concerning the causes, prevention, treatment and care of all forms of mental disease and defect.

The vastness of the field for mental hygiene is partially indicated by the existence of the twelve great state hospitals for the insane in Massachusetts, with 15,000 patients under treatment, the majority of these patients representing those whose insanity began when they were young. Over 3,000 new patients are admitted annually. One person in 259 of the inhabitants of the State are patients in these hospitals. The cost of these hospitals for 1919 was over $6,000,000, representing one-half of the State tax, and more than one-fourth of the State expenditures.

Massachusetts also has two schools for the feeble-minded, with 2,500 patients, and hundreds applying for admission. There are over 12,000 persons in the state known to be feeble-minded, with the probability that the actual number is at least twice that number.

There is one hospital for epileptics with 1145 patients. The State is also called upon to support hundreds of inebriates and mentally defective delinquents in its penal and pauper institutions.

The patients in the hospitals named do not include the many cases of mild insanity cared for at home, perhaps masquerading under the friendly diagnosis of nervous prostration or neurasthenia, or coming under the head of the minor psychoses or of the psychoneuroses.

Massachusetts has always been generous in its treatment of the mentally sick, and the writer believes that the present standards of hospital care in this state compare favorably with the best in the world.

It is a striking fact that the average patient who is committed to a state hospital or a school for the feeble-minded has not consulted a physician for his mental malady until the physician is called upon to sign the commitment papers. In other words, the physician is seldom called upon to treat incipient stages of mental diseases, although such diseases are often amenable to treatment before they are fully developed. In fact, the prognosis as to cure is usually in inverse ratio to the duration of the disease.

The reasons for this delay are many and complex. Personal and family pride is largely responsible. Mental disease to many people still connotes personal and family inferiority, perhaps a persistence of the medieval idea of demoniac possession.

A mistaken interpretation of the ideas of heredity as applied to mental disease develops a sort of fatalism and of horror at the appearance of mental trouble, whereas an intelligent understanding of the exact family liability is often sufficient to prevent the dreaded event.

Some forms of mental trouble may be hereditary and other forms are never hereditary. Even with hereditary tendencies as a predisposing cause, a definite exciting cause or causes must usually be added. The vast majority of the ancestors of every individual were normal and sane. Heredity tends more strongly towards health than towards disease. A person with mental trouble in the family may usually escape mental disease by proper surroundings, healthful and temperate activities, and proper mental and physical habits. Indeed, most forms of insanity do not appear suddenly, but develop gradually and might have been seen earlier by close observation.

Certain forms of insanity are probably incurable from the beginning, but nearly one-fourth of the patients admitted to the hospitals are sent home recovered. Many forms of mental disease are due to known and preventable causes. Many of the 15,000 persons now in our hospitals might have remained sane and lived useful and happy lives if they or their friends had known certain facts and acted accordingly.

The art of mental hygiene largely devolves upon the general practitioner—who alone has access to these patients in their pre-psychotic or highly curable period. Even the best of our medical schools pay very little attention to the teaching of psychiatry compared to its importance and the size of the field. The average physician has received very little instruction as to the signs and sypmtoms of the pre-psychotic stage, as shown by minor failure of adjustment and adaptation, a distaste for former work and interests, change of habits and feelings and emotional reactions.

The psychiatrists themselves know far too little of the juvenile and adolescent danger signals of future mental disease. The high school period often shows signs of mental or social distress, which, if recognized and acted upon, would prevent future mental breakdown. And the disciplinary problems of any college include many students who need the physician or the psychiatrist rather than the pedagogue or the disciplinarian or the moralist.

White has aptly said that "childhood is the golden period of mental hygiene," and yet in public and private schools very little application has been made of the science and art of mental hygiene. The child is expected to adjust himself to the work of the school. Little attention is paid to his heredity, his inferior or superior intelligence, or to innate personality traits like emotional instability, egocentric tendencies, feelings of inferiority, special aversions, special disabilities and his keen desire for adequate self-expression. In reviewing the school history of psychotic patients, it is often found that even in school life marked deviations of behavior and emotions and feelings occurred. We shall eventually prevent many cases of potential mental disease by proper recognition and understanding and management of these forerunners of mental instability in the school period. No field in preventive medicine offers a more promising opportunity than this teamwork of the psychologist, the psychiatrist, the teacher and the family physician.

Many juvenile and adolescent problems are caused or intensified by poor parental management. Often too much has been expected in the way of school achievement, social success, in earning capacity, or they have had uncongenial work, too little recreation, limited interests, lack of proper sex knowledge and understanding, etc. These cases often clear up at once when the proper readjustment has been made by taking off the load, perhaps by a new school, different studies, a new job, new interests, a good talk with a trusted physician, and perhaps an entirely new environment.

Untreated, such cases often become permanently warped and disabled, if not actually insane. There is a great need for an authoritative manual on "Mental Hygiene for Parents," comparable with Dr. Richard Smith's book, "Baby's First Two Years." Parenthood *per se* does not always imply inspiration in fitting boys and girls to meet the complex problems of our modern civilization.

The employment and personnel managers of our great industrial interests are keenly alive to the significance of the mental factors in problems of individual and group unrest and turmoil in their organizations. A man with a paranoid personality of wordy type, with capacity for leadership, finds a fertile field in the many unstable and suggestible mentally inferiors to be found in any large group of men. Some such combinations help to explain "mob psychology," as expressed in rioting and violence.

Within a few years the State Department of Mental Diseases has established out-patient clinics in many cities of the State, conducted at regular times by the staffs of the various state hospitals and schools for the feeble-minded. Such clinics are now available all over the state. They are being used freely by many patients who would not go to state hospitals, and many of whom are going through the incipient or most curable stages of mental disease. The Psychopathic Hospital in Boston also receives presumably mental patients for thorough examination and advice, and also conducts a daily out-patient mental clinic. There is an increasing tendency for physicians to refer mental problems to these out-patient clinics. Of course, there is no money charge for the advice given at these clinics.

The last legislature passed laws requiring a mental examination of all school children found three or more years retarded in school performance, and requiring cities or towns having ten or more mentally defective children to give these retarded pupils suitable training and education in special school classes.

This is a flank movement for the benefit of the feeble-minded of the state. In a few years all such people will be recognized, for all children come under the control of school authorities between the ages of 6 and 14. This will eventually mean that every feeble-minded child may receive proper education, habit training and industrial training during the formative period of youth. The idiots and imbeciles not cared for at home, and the highly potential hereditary defectives with sex tendencies, and those with criminal tendencies, will gradually be drafted into the institutions. We know now that some mental defectives are inherently bad and vicious, and that others are tractable and may be made industrious and harmless. We no longer believe that all mentally defective persons need to be permanently confined in an institution.

The army tests revealed thousands of technically mentally defective drafted men whose mental defect had not prevented self-support and practically blameless lives. Much of the rough and disagreeable manual labor of the mines and fields and forests is performed by persons who could not pass the modern intelligence tests. The lack of 100% efficiency alone does not call for institutional care, or for the taking away of the "right to liberty and the pursuit of happiness."

Original Articles.

A CASE OF MULTIPLE SCLEROSIS*.

By Florence L. Meredith, M.D., New York.

The following case has been under observation, although not directly under the writer's care, for nine years. The main portion of this history was written four years after the onset, and the appendix today:

Male, 43 years old, lawyer. Family history: Father died at the age of 60 of chronic nephritis. Mother living and well, now 75. One brother living and well, although he had neurasthenia five years ago. Patient is married and has two children, one perfectly normal, the other of highly nervous temperament, having been obliged to miss a whole year out of school at the age of 16 on this account. There is no history in the family of any organic nervous diseases, tuberculosis, syphilis, or cancer. Neither were there any mental troubles. Patient's mother is said to be almost pathologically awkward in gait and all motions.

Past History: Patient had most of the children's diseases, but was otherwise considered well. Never had convulsions. Was of athletic type in school days. Had a peculiar habit of lying down flat on his back on the floor instead of sitting in a chair, whenever opportunity offered, all through his youth. The first neurological symptom appeared at the age of 19, when he had a unilateral strabismus of sudden onset, lasting a few months and disappearing as quickly as it came. He was always a heavy smoker, consuming sometimes a dozen strong cigars a day. Very moderate use of alcohol, tea, and coffee. At the age of 20, had a severe attack of malaria. No history of venereal disease or even exposure. At the age of 33 had serious business trouble, causing much worry and anxiety for several years after. At the age of 35 had a fall backward on the ice. Hit on the back of his head and was unconscious for about an hour. No results were observed and recovery was apparently complete in a few days. The following winter he had an exactly similar fall with unconsciousness for a shorter period, and prompt recovery.

Present Illness: Four years ago patient first noticed that his legs were getting weak, especially the left. No pain. Family also noticed that his speech was slow and exact. This gave the impression of increased dignity, which, however, was in contrast to sudden bursts of almost uncontrollable laughter at slight provocation. At the same time he began to walk unsteadily. None of these symptoms were sufficiently marked to be noticed by anyone except his family. He frequently said jokingly that he was a sick man, but no one took him seriously at that time.

About six months later he had a tooth drawn under nitrous oxide anesthesia, and was peculiarly affected by it. He became cyanotic and remained so for some time after recovering consciousness, and was so weak muscularly that he was unable to walk home, nor was he able to walk alone for a week or more, and then only with a cane. He has never gone out without a cane since. From this time on, he became progressively worse for several months. Frequently fell down, always either forward or back, but never hurt himself. A labyrinth test revealed nothing pathological. Strabismus reappeared, this time of the left eye only. He was then taken to a neurologist, who made the diagnosis of multiple sclerosis and offered him no encouragement. At the advice of friends he took up massage treatment, and after two weeks was so greatly improved that he was able to run for a car on one occasion. The masseur was then obliged to go away for two weeks, and the patient went promptly back to his previous condition. Subsequent massage had no effect. Added symptoms also appeared in the arms, which were practically unaffected for a year after the onset. The arms grew very weak and a tremor appeared whenever he tried to use them, so that he was unable to write without tearing the paper, or to feed himself without spilling the food. Severe constipation for a time and some retention of urine were added later to his symptoms.

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* The first part of this paper was read at a meeting of an association of women doctors in Boston (Hotel Victoria), in 1915.

No real pain at any time throughout the disease, although he complained for a time of a girdle sensation around the lower thorax, and also around the head. He had a period of several weeks when taste was almost lost, and later a period of several months of partial amblyopia, when reading was impossible. At another time, for several weeks, he complained of hemianopsia. In spite of the strabismus he never had diplopia. Twice during the past four years he has been confined to the bed for periods of two and three months respectively. Each time it seemed to be because of great muscular weakness and a feeling of exhaustion. On at least four occasions he has had attacks resembling apoplexy, which passed off quickly, leaving no paralysis and the patient in the same condition as before. These all came on during the day, after some special exertion. Has not smoked for about a year. Closed his law office at the beginning of the disease, although he continued to see clients at home for a few months. Has made no attempt to conduct any business for three years, on account of some mental enfeeblement of which he is conscious, but which is not apparent to his family. They declare him to be in his usual mental condition except that he is a little overexcitable, laughs and cries easily, and occasionally repeats himself, as an old man will do. Has always slept well, has good appetite, and does not, apparently, worry about himself. He is possibly a little too care-free. Spends his time reading in an unsystematic way.

Physical Examination: Well developed and nourished man. Trunk better nourished than limbs. Sits all day in a large chair with feet propped up. Is moved there, with very little coöperation on his own part, by his wife and son. Makes no attempt to rise in greeting. Extends his hand, which trembles violently, and says, "How—do—you DO," with a pause between each word and extra emphasis on the last. His voice is not modulated, but is all on one tone. This is his invariable method of speaking. The enunciation is uncommonly distinct, possibly because of special effort. In answering questions he delays some seconds before commencing a reply. Facial expression lacking in mobility. Absence of lines in the face, even while talking. Lips rather full and relaxed. Both these characteristics are newly acquired.

Examination of Cranial Nerves: Pupils small, equal and react to light and distance normally. Palpebral fissures equal and normal. Marked internal concomitant strabismus. All movements of the external ocular muscles can be made, including those of the external rectus, but are made weakly and cannot be sustained. There is slight lateral nystagmus, not present constantly, but only on extreme lateral deviation of the eyeball, not on vertical deviation. No diplopia or hemianopsia can be determined. Vision about normal with glasses, slightly myopic without. Visual fields concentrically slightly narrowed. Slight loss of discrimination of colors. Ophthalmoscopic examination showed optic disc pale, outline slightly cloudy, vessels not tortuous. All movements of the facial muscles are possible, but weak, some tremor induced. Sensation normal on right side of face and head, but diminished to touch, pain, and temperature on the left. Tongue protruded fairly steadily in the median line, not far beyond the teeth. Taste normal to sweet and sour substances. Palate moves normally. Hearing normal, but there seems to be delayed perception of sound. No hyperacusis or tinnitus.

Head is held steadily without tremor on the trunk. Can be turned in all directions with normal strength, but is almost invariably held in the median line. No stiffness of the neck. Arms are rather thin, although muscles feel quite firm. No spasm on passive motion. All movements made weakly, however, and accompanied by a violent tremor involving the whole arm from the shoulder. Oscillations are at the rate of five to eight per second. The usual tests for ataxia are both impossible and unnecessary as the ataxia is very apparent. Marked adiodococinesis. Triceps, biceps, and radial reflexes about normal in right and slightly decreased in the left arm. No Jacobson. In both hands the interossei are greatly wasted. Grasp is fairly strong, but intermittent. No tremor when the arms are at rest, but when motion is attempted the tremor increases with the extent of the motion.

In the lower limbs the thighs are quite wasted, calf muscles about normal. Measurements equal on both sides. Double Babinski. Knee jerks and ankle jerks both greatly increased. Double ankle and patellar clonus. Spasm in both knees on passive flexion and extension. Marked ataxia in heel to knee test, tremor similar to that described in the arms on attempted motion, none at rest. There is some loss of strength. Sensation normal on right arm and side of face, diminished on left. Somewhat reduced over entire left side of body. Temperature sense also diminished. No vasomotor or trophic changes, skin and keratin tissues normal. Cutaneous reflexes not tested. Electrical reactions not tested. No contractures anywhere. Some atrophy of the interossei.

Station is very unsteady, apparently due to both weakness of the muscles and to incoördination, as well as to vertigo, from which the patient suffers only when attempting motion. Cannot stand without assistance. Sways forward and back, never from side to side. Not more pronounced with eyes closed. Gait shows muscular weakness, active spasm, ataxia, and cerebellar staggering. A general tremor of the whole body is produced. Back held rigid, whole body bent forward from the hips. Toes drag, although passively foot can be brought easily beyond a right angle with leg. Physical examination otherwise negative. No stigmata of degeneration. Urinalysis negative for albumin, sugar, and lead. Wassermann on both blood and spinal fluid negative. No excess of lymphocytes or globulin in spinal fluid.

Differential Diagnosis: First should be ruled out *functional disorders.* Many features of *hysteria* are present. In the motor system we have paralysis and paresis, spasm tremors and the history of seizures of various kinds. In the sensory system we have hemianesthesia, contracted visual field, transitory loss of vision and taste. In the psychic sphere we have lack of will power, excitable disposition, easy laughter, and tears. We lack the customary fondness for sympathy often observed in hysterical cases. But there is no need of considering hysteria as the sole trouble present when we have such definite signs of organic disease as are supplied by Babinski's sign, increased tendon reflexes and the slight though definite optic atrophy. These three things of course indicate organic trouble, but it is possible that there is some element of hysteria in this case, too.

Neurasthenia can be ruled out on the same grounds, although that diagnosis was held by his family physician for some time, who considered the tremor, the weakness, the increased reflexes, the mental asthenia, the sensory disturbances, and the easily exhausted vision only exaggerated symptoms of the neurasthenia prevalent in the family. The clonus he considered spurious. The Babinski had not appeared when he made his diagnosis, and he never had an ophthalmoscopic examination done. Our patient had never had the insomnia, the phobias, the headaches which accompanied neurasthenia in the other members of the family. He may indeed be afflicted with neurasthenia, but it is certainly not all of his trouble, as he and his family believe still.

In many ways this case resembles another so-called neurosis, paralysis agitans. There is muscular rigidity, tremor, increased reflexes, face expressionless and mask-like, speech monotonous and deliberate, face held in the median line and mental enfeeblement. But here the resemblances ceases. In this patient there is no tremor while at rest; in paralysis agitans it would be constant and would be reduced by muscular effort. In this case the tremor is extensive, involving the whole arm; in paralysis agitans it is more marked in the distal portions of the limbs. The latter disease seldom begins as early in life as in this case, and for some reason almost always shows the peculiar bent forward position in walking and also in sitting, which is not a prominent feature here. Ankle clonus is not present in paralysis agitans, but it often parallels our case in producing an uncommon amount of disability in proportion to the physical findings, together with a somewhat similar mental condition to that of our patient.

Considering the tremor as the prominent symptom we should also have to rule out *essential* tremor, a disease which produces an identical tremor to the one described. But it is a family disease, and does not carry with it such a train of other symptoms, since it is probably a neurosis without lesions. Alcoholic tremor, which also occurs only on motion, does not need consideration here. Nicotine poisoning would certainly have to be considered in finding a cause for this case of multiple sclerosis, but could not be considered as an entity.

Having sufficient signs of organic lesions, and being obliged to abandon functional conditions, we are led definitely to multiple sclerosis and possible associated functional disturbance, by the irregularly distributed paralysis, with some reflexes increased, others diminished, with Babinski, intention tremor of which the nystagmus is a part, scanning speech and partial optic atrophy. It is easy to throw a collection of symptoms together and call it multiple sclerosis, but before doing so a number of other possibilities in the way of organic disease should be ruled out.

In the first place, disease confined solely to the *peripheral nerves* must be excluded. The quadraplegic distribution suggests *multiple neuritis,* also the intention tremor and the optic nerve trouble. But in multiple neuritis the reflexes are diminished and the limbs are flaccid, and are particularly weak in extension. There is no true clonus, and there are prominent sensory symptoms. Atrophy comes on and vasomotor changes, but not any abnormal reflexes. Contractures are quite likely. Henschen has reported a case of diphtheritic polyneuritis which went on to become multiple sclerosis, as shown by autopsy.

Leaving the peripheral nerves, we come to *cord diseases. Chronic poliomyelitis* can be ruled out on the grounds just given, that is, it would give a paralysis of the lower segment type. The wasted interossei and the flaccid arms in our case suggest that there must be involvement of the anterior horn cells of the cervical region, but there is no evidence of such involvement elsewhere.

Degeneration of the posterior columns. The patient told me quite frankly that he supposed he had locomotor ataxia, but I had to rule it out because of the increased reflexes and spasticity, and the absence of lightning pains and other tabetic symptoms, as well as the history. Any ataxic condition the public is prone to label syphilis, regardless of the unhappy effect on the patient,—not only the public in this case, but the man's oldest neighbor, a physician.

Primary lateral sclerosis. Such a condition may be possible uncomplicated. While it would account for the condition in the legs, as far as spasm and increased reflexes are concerned, it would not satisfactorily account for the condition in the arms, nor for the sensory disturbance, the eye symptoms, and the general weakness.

Erb's spinal paralysis, of toxic origin,—usually syphilis of the lateral columns as tabes is of the posterior columns. This accounts nicely for the picture in the legs of this patient, but leaves unaccounted for the flaccid arms, the tremor, the speech defect, and the sixth nerve involvement.

Secondary spastic paralysis, following chronic myelitis or thrombosis of spinal vessels, caries of the vertebrae, tumor pressure, fracture or meningo-myelitis. Any of these causes would also produce a spastic paralysis below the level of the lesion. Some of them also produce a flaccid paralysis by involvement of the anterior horn cells at the site of the lesion. In this way we could account for the condition of both the arms and legs in this patient, by supposing the lesion to be at the level of the arm area, but we should still have to seek further for an explanation of the condition in the head, and of the tremor. The possibility of trauma at the time of the fall on the ice is somewhat suggestive, but there were no symptoms other than brief unconsciousness at that time. There was no pain to have been suggestive of myelitis, and what few sensory disturbances he has had were slight and have failed to persist. Furthermore, he had had strabismus before the fall.

Combined System Diseases. If a lesion in no one tract will account for the symptoms in this case, perhaps we can account for them by a lesion in more than one tract. There are two types of combined system diseases to consider. The first is *postero-lateral sclerosis or ataxic paraplegia.* This condition, in some cases, is difficult to differentiate from multiple sclerosis, as it may clinically almost correspond to it. Had my case not presented the nystagmus, the scanning speech, optic atrophy, and intention tremor, in other words, had it been confined to the cord, the remaining condition could not have been differentiated from ataxic paraplegia. In reality it is a limited ataxic paraplegia plus other lesions. The dorsal and lateral tracts are also involved in another disease which presents a somewhat different picture clinically,—*Friedreich's ataxia.* In order to exclude this hereditary or family disease, I examined the patient's mother, who was said to be awkward. I found her quite ataxic in all motions of arms and legs, speech incoördinate and slovenly within normal limits, attended by slight grimacing. She is an old woman, but goes out every day alone, although she frequently falls down. Also falls down stairs in the house occasionally. In all other respects, normal. She and her son have neither form of hereditary ataxia as it is commonly known, probably the condition in each of them being founded on neuropathic tendency. Friedreich's ataxia shows flaccidity and absent reflexes, rarely has eye symptoms, has an atypical tremor and speech defect, while the hereditary cerebellar form lacks spacticity until late in the disease. Furthermore, no other case resembling ataxia has ever appeared in the family on either side, for several generations certainly, or as far back as their knowledge Strange to say, our patient's uncle has an invalid wife in much the same condition as this patient. She was not where she could be examined by me, and, so far as any of the family know, no diagnosis has ever been made.

One form of *secondary posterolateral sclerosis* is related to anemia. It is possible that some of these forms which have been considered primary may be in reality secondary. Some cases certainly are definitely secondary. Interstitial changes arise and are later followed by sclerotic foci. They may also arise in pellagra, ergotism, and chronic wasting diseases. They are accompanied, as would be supposed, by neuralgias and sensory disturbances. Unless the cause is suspected and measures taken toward cure, the primary condition usually results in death after a shorter period than our patient has survived. But with anemia in mind, we had a blood count and found it normal. Riggs reports several cases in which anemia and multiple sclerosis were combined, and he thinks both came from the same toxic origin, and believes the nerve symptoms may precede the blood picture by some time.

The other type of combined system disease is *amyotrophic lateral sclerosis,* involving the anterior horns and the lateral columns. It is worth considering in this case, because we have definite signs of pyramidal tract involvement in the legs and of anterior horn involvement in the arms. If the anterior horn cells were involved before the lateral tract we should still have flaccidity, even after lateral tract involvement, because there would be no way by which spasticity could be produced after the anterior horns were gone. But in this case we have definite pyramidal tract symptoms. The sequence in antero lateral sclerosis is finally a complete anterior sclerosis, including the nuclei of the cerebrum, which are analogous to anterior horn cells of the cord. When this takes place any spasticity which had been present would of necessity disappear, leaving atrophy and flaccidity throughout. After more than four years there is no indication that this is taking place in this patient. There is still practically no atrophy. For this reason, and on account of the less complete loss of power, the slight but definite sensory involvement, the nature of the tremor, which is not fibrillary, and the non-appearance of bulbar symptoms, we can rule out amyotrophic lateral sclerosis.

Syringomyelia was easily ruled out on account of the absence of the peculiar sensory features and of complete atrophy with vasomotor changes in any one set of muscles. If our anterior horn cells are involved at all they are only lightly attacked, perhaps with minute microscopic plaques.

Cord and brain symptoms in the same patient always suggest *cerebrospinal syphilis.* The absence of positive laboratory findings and also the absence of the quite usual headache and third nerve involvement is against it. In the cord it has already been ruled out in the form of disease of the posterior or the lateral tracts. It can be ruled out as meningitis or meningomyelitis, because there is not and has not been enough pain, especially pain of the back and limbs. Other forms of meningitis can be ruled out in the same way.

Concussion of cord and brain is suggested by the history of falls. It is quite possible that hemorrhages which have since been organized might have been the cause of this trouble, but it seems as if there would have been some symptoms between the time of the last fall and the onset of the present illness. My theory is that the falls were the result rather than the cause of the disease, the actual onset of the unsteadiness being much earlier than the patient realizes.

That the conditions might be a *diffuse encephalomyelitis* would certainly have to be considered. This is probably the most difficult condition to rule out. There is very little, homever, in the history to suggest a general infective process, except the fact that there are multiple lesions of some sort to be accounted for. Had the attack of malaria appeared before instead of after the initial strabismus, it would have been easy to attribute the whole condition to malaria. If it is infective at all, it is certainly a low grade type, such as is seen in chronic arthritis. Starr says that a diffuse encephalitis is often the starting point for the so-called cases of multiple sclerosis. Some authorities consider the two conditions identical. Most authorities, however, seem to consider sclerosis, occurring in the form of multiple foci, a separate condition from similarly multiple foci of inflammation: in other words, although sclerosis may be secondary, it may also be primary, at least as regards inflammation. That this case is one of the latter type is suggested by the neuropathic history, the absence of any other signs of chronic infection, the gradual progress from the onset on, the symptoms showing a less absolutely destructive lesion than inflammation would be likely to produce, no pronounced pain or atrophy or paralysis, and the strict adherence to the rather definite and fixed symptomatology commonly found in cases which have afterward been shown post-mortem to be sclerosis. Still, if a disease with multiple foci cannot be attributed to vascular conditions, nor to that most common infection of the nervous system, syphilis, no stone should be left unturned in the effort to unearth another chronic infection, febrile onset or not, typical symptoms or not. Unfortunately, this patient's psychic condition has been just enough altered to make it impossible for any of the number of physicians who have seen him to interest him in any further diagnostic measures.

Brain Lesions. With the exception of the flaccid condition of the arms and the wasted interossei, we could attribute this trouble to conditions entirely within the brain, or rather the cranium. Imagining a lesion in the motor cortex, or the internal capsule on each side, and in the sensory area of the cortex on one side, or the posterior limb of the internal capsule, we can account for the spastic paralysis and the hemianesthesia, not with single, but with multiple lesions. The condition of the second and the sixth nerves and the mental condition would require still more lesions to be included. We should even then have to leave the brain to account for the arms.

Huntington's chorea, a diffuse chronic inflammation of the cerebral cortex, was ruled out by the amount of disability, the sensory and cranial nerve involvement, the condition of the arms, and the different character of the speech defect and tremor.

Paresis, presenting a similar anatomical lesion to the above, did not have to be ruled out after a consideration of the mental defect. The changes in our patient seem to be more those of disposition and concentration, and are not very marked except on occasion. Seiffer, who made a study of mental states in multiple sclerosis, believes there is no qualitative difference between the dementia which occurs in multiple sclerosis and other dementia. Dercum has reported a case which was diagnosed as paresis during life, in which a post-mortem examination showed multiple sclerosis with most of the lesions in the cortex. Usually in paresis the tremor is finer and there is seldom nystagmus, and the symptoms are those of a diffuse rather than multiple lesions.

Brain tumor is not suggested except by vertigo, optic neuritis, and the cerebellar staggering, which in this case point undoubtedly to lesions in the cerebellum, perhaps several large lesions fused into one, but which do not point to an exclusively cerebellar involvement. The symptoms which might be referred to increased intracranial pressure can better be accounted for by multiple focal lesions.

Finally, we may consider a form of *pseudosclerosis,* of which only a few cases have been reported, in which the symptoms are identical in all respects with multiple sclerosis, but which post-mortem shows no lesions. This condition certainly could not be ruled out if such a condition exists. It is difficult to imagine any functional disorder doing exactly this, but when this possibility was mentioned to the patient's wife she expressed an opinion that if it could take place with anyone, it could in her husband, as she has considered him highly neuropathic for many years.

There are probably as many more conditions which might occasionally have to be differentiated from multiple sclerosis, for a disease with multiple lesions naturally takes multiple forms. The three symptoms first mentioned by Charcot are strangely likely to appear in every case, although it has been recognized that they frequently do not go on to completion in this disease as in some others. Their great prevalence may be due to the fact that we do not often make a diagnosis of multiple sclerosis without them. Given them, we have the disease; given the disease, we have them. The diagnosis is made about four times as often in Europe as here, perhaps because they make it on the grounds of multiple lesions, regardless of the presence of the Charcot triad, which, it seems, might easily be absent, even with many other lesions present.

The gait is often the first symptom which is particularly observed. It usually shows some combination of the spastic and the cerebellar. It is rare to find the lower extremities uninvolved. Unilateral cases have been recorded and those which changed from side to side during the disease.

The tremor is usually, as in this case, more marked in the upper extremities. My patient knocks most things he reaches for onto the floor, and can handle only those things which are unbreakable. He drinks through a rubber tube because a glass cannot be put near his mouth without risk of his breaking it by intention tremor of the hands.

The nystagmus is, in this case, of the type it should be in order to correspond with the tremor of the intention type. His nystagmus comes on only when he attempts to use his eyes for a definite purpose. While sitting at rest, with his eyes not especially in use, there seems to be no nystagmus, but in trying to fix on an object at an angle, without turning the head, the nystagmus becomes quite marked. I believe it is recorded that about 14% of cases show constant nystagmus. It seems reasonable to think of the nystagmus as intention tremor of the eye muscles, but since the eye muscles are virtually in use all the time, a constant nystagmus might very well occur.

Some authorities consider optic atrophy more important than nystagmus, but since a plaque need not necessarily be located so as to cause optic atrophy although many plaques might be demonstrated in the body elsewhere, it seems to me that nystagmus would be more typical, while possibly optic atrophy may be an incident which is equally common. Vision frequently does not correspond to fundus finding, and often suggests hysteria. This is undoubtedly due to the fact that the optic nerve may be involved in neuroglia proliferation while at the same time the axis cylinders may remain intact. Pupils do not seem to be typically involved in this disease, nor do cranial nerves, although the sixth was involved in sixteen out of twenty cases I have seen.

The sensory symptoms are not often as well defined as in this case. Fremd says they are are usually at the distal portions of the limbs. They have been throughout distributed only to one-half of the body in this case. As in the case of many of the symptoms of multiple sclerosis, their transient quality and changeability make one think of hysteria.

Vertigo, which was present in this case I am sure, at least part of the time, while he was still ambulatory, although he always denied it, has not troubled him, apparently, while sitting. If present in this disease it is difficult to say whether it is due to involvement of the cerebellum, or the nystagmus, and consequent dancing of objects before the eyes, or to diplopia. He denies diplopia, does not complain of the effect of the nystagmus when seated, and we are thus obliged to consider it as cerebellar. This is confirmed by the fact that his station was poor, apart from lack of good muscle control, even with the eyes closed.

It is rather odd that this disease should so systematically develop a tendency to spasmodic laughter. In this case it was not due by any means to lack of coördination of the muscles used in laughing. The impulse to laugh seemed uninhibited. Crying has not been a prominent part of his program, and is seldom so to as marked a degree as laughing.

The cerebral features are often made to include the speech defect, but it seems more natural to consider it a motor trouble, spasm of the muscles of articulation. The patient pounced on the end of each sentence in the same way that he pounced on an object when grasping it. Excitement greatly increases this symptom, as it does most of his symptoms.

Charcot, long ago, described a typical facies, —lips hanging down, half open, expression of mild stupor. This exactly describes this patient. Until I saw a picture of him taken ten years before I had supposed it to be more or less his natural expression, increased by illness. But it is plainly a change entirely due to the disease. There is no loss of fat in the face, but considerable elsewhere. Actual atrophy does not appear to have occurred apart from the interossei and possibly the thighs.

In the consideration of the probable pathology in this case, the idea is very strongly suggested that whatever agent is responsible for the condition, its work began in his childhood, before his tendency to lie on the floor began,— a habit which was considered by his family to be undoubtedly due to some discomfort he would never mention, and before the first appearance of strabismus. One would certainly be justified in considering the possibility of a specific infection of some kind which attacked the mother, the mother's sister-in-law, and the patient. Nothing can be recalled of an acute attack, but the history included a short time when the two families were more or less closely associated domestically, during the patient's childhood. The symptoms of nervous diseases came on more rapidly in the aunt, but subsequently were almost matched by the unrelated patient. The mother had meanwhile developed many similar symptoms to a very much less degree. As regards the location of the lesions, I would venture to prophesy that autopsy will reveal several plaques in the lateral columns of the lumbar region, others in the anterior horns of the cervical region, one in the posterior limb of the internal capsule, others in the nucleus of the sixth nerve, one behind the optic disk of each side, and many small ones in the frontal region.

Since the patient refuses all medical care, no treatment is possible. An autogenous vaccine has been urged but refused. Not much is permitted, even in the way of nursing and hygiene. Unless his will power weakens or his sufferings increase, it will probably continue thus until he ultimately succumbs to intercurrent disease,—nephritis or pneumonia, most likely. The apoplectiform and epileptiform seizures, to which he is liable, may cause complete disability at any time, although it is reported that even a complete paraplegia following such an attack may be recovered from. Several remissions may be considered to have occurred in this case, since he got around again twice after having been temporarily bed-ridden. Bulbar accidents may be looked for, in which case death would be directly due to the lesions of the disease, a rather rare conclusion. If the medullary centers were involved more often in this disease it might be better for its unfortunate victims.

APPENDIX.

Five years after the above history was written the patient is still living, now quite helpless. He has been bed-ridden for four years, but can be moved to an invalid chair, where with the aid of supports he sits for a few hours every day. He has no motion of any limb except a useless amount in the right arm. He is unable to see for reading, but can recognize people and objects fairly well. Optic atrophy has progressed to a considerable degree. Other neurological findings have remained about the same.

He has twice had attacks of retention of urine, which lasted several days, requiring catheterization, but both times he came back to his previous condition of continuous involuntary flow from a full bladder. He has had little rectal retention throughout. In spite of poor nursing at various stages, he has not developed trophic sores. Speech is almost incoherent, and the mind seems rather feeble. He has kept in a very cheerful frame of mind, frequently having bursts of uncontrollable laughter, which are perhaps not as merry as they sound. He shows a rather childish irritability, some loss of memory for recent events, considerable loss of the ability to concentrate, great indifference to the cares of the world. The fact that his wife must support the family leaves him quite content, although he would have been horrified at the thought of it a few years ago. The death of his almost worshipped daughter made very little impression on him. His own comfort, however, matters a great deal.

There has been no treatment of the case, except of symptoms as they appeared, and even that was sometimes refused absolutely. Efforts have been largely directed toward keeping his mind content and his courage good, and also toward keeping him from the restlessness which has been his great trouble. It is fortunate for these chronic invalids that there are so many cults which promise mental healing. He has tried one after another and has gotten happiness from each in turn. His former intelligence would have scorned to be helped by anything save established philosophy, religion and psychology, but in his enfeebled state, these fantastic cults have been invaluable, chiefly because they promised cure, which, of course, nothing more scientific could do. He is unable to acquire in legitimate ways the state of mind which would enable him to cope with his condition. Lately he has become more and more a burden to himself and his family and is less interested in cures. Sometimes he asks for drugs so that he can "go to sleep and forget."

CLINIC ON THE DIAGNOSIS AND TREATMENT OF NEUROSYPHILIS.*

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(Concluded from page 730.)

CASE 12. Tabes Dorsalis: Orissa I. is a woman 37 years of age. For the past eight years she has been troubled with acute lancinating pains of the legs, which at times had been so severe as to necessitate hypnotics and prevent her from working. She had been told that she had neuritis, and was given various drugs, which she claimed had had no effect. In addition to her pains, she had some difficulty in walking, especially in the dark. The neurological examination showed unequal pupils, which reacted poorly, absent knee jerks and ankle jerks, and a positive Romberg. The blood and spinal fluid were positive. Everything, of course, was consistent with the diagnosis of tabes dorsalis. Under intravenous injections of arsphenamine, there was marked improvement of the symptoms. The pains have entirely disappeared, and have been absent for a period of a year. The gait is markedly improved. The spinal fluid, however, remains positive. According to my experience, a few intraspinous injections would probably change the spinal fluid reactions to normal, and these injections are now indicated.

CASE 13. Improvement following Treatment in the Paralytic Stage of Tabes Dorsalis: James F. is a man 34 years of age, who was practically bedridden as the result of his tabes. He had all the classical symptoms of the disease, including Argyll-Robertson pupils and strabismus, absent knee and ankle jerks, impotence and such marked ataxia that he was unable to walk even with the aid of canes. When seen at the hospital, he had already received quite a number of intravenous injections of arsphenamine, but had steadily become more helpless. He was then given intraspinous injections of Swift-Ellis serum, reinforced with about one-third of a milligram of arsphenamine. He has now had nine such intraspinous injections, and at the same time is able to walk fairly well without the aid of a cane, and with the aid of a cane is able to go about freely. When he first came to the clinic he was carried from a taxicab to the operating table in the arms of an attendant. Today he comes in the street car, and walks into the operating room unaided. This case is particularly interesting, not only from the therapeutic results, but from the fact that when seen he had a negative blood and spinal fluid. It is generally believed that the cases of tabes most amenable to treatment are those which show high cell count and evidence of an active inflammatory process. In a general way, this is quite true. However, this is somewhat of an exception to the rule, and brings out the rather interesting point, that starting with the practically negative spinal fluid, a couple of intraspinous injections resulted in the production of a comparatively strongly positive spinal fluid, which remained positive for a number of months and then again approached a negative condition.

I have no hesitation in insisting that much symptomatic improvement may be obtained in the treatment of tabes. The earlier the case is treated, the more effective the treatment. However, good results are not infrequently obtained in the late cases. This does not mean that every case of tabes will show satisfactory improvement, but that many will. Theoretically, the results are obtained by an improvement of the inflammatory process, the removal of the spinal cord irritation, which then allows the patient to utilize the undestroyed tissues, which, in many cases, are quite sufficient to carry on all necessary functions.

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I can attempt to summarize in a few words the type of treatment advised in cases of tabes. To begin with, intravenous injections of arsphenamine at intervals no longer than once a week, and in cases which bear the treatment well, treatment may be given twice a week. If, at the end of two, three, or four months, satisfactory improvement has not been obtained, then intraspinous injections are added. Intraspinous injections are nearly always quite painful to the tabetic and there is always the possibility of producing acute sphincter disturbance. Hence, I believe it is advisable to see if one can get satisfactory results without intraspinous therapy. However, the pain and the possibility of the sphincter disturbance are not sufficient to contraindicate the use of the intraspinous method, and it should be almost invariably used either to aid unsatisfactory intravenous treatment results, or to finish off intravenous treatment.

We should not neglect the important consideration of the general condition of the patient. Tonic treatment consisting of good food, good hygiene, hydrotherapy, and massage, are important adjuvants. Optimism is especially important, and it is the physician's duty to inculcate it. In the ataxic cases reëducation is important.

Paresis, in the past, has been considered an absolutely hopeless condition, fatal in 100% of the cases, and leading to more or less rapid mental deterioration. The vast majority of the cases have a steadily progressive downward course, the average duration of life being about two to two and a half years after the onset of symptoms. A small percentage of the cases have remissions, that is, a period of improvement lasting from a few months to a year or so. In the Commonwealth of Massachusetts, about 2½% of the cases committed to the State hospitals have shown remissions, the vast majority of these lasting under six months; a few as long as one year. Under treatment the results are often much better.

CASE 14. Therapeutic Results in General Paresis: Albert W. was brought to the hospital in his forty-sixth year from the court, having been arrested for grabbing and running away with a woman's purse. The patient had been a successful business man, and the larceny was entirely out of keeping with his past career. The history showed that for some months he had been very peculiar, attempting to strike his child with a red-hot poker, embracing his wife in the street car, sleeping in the midst of business transactions, and in general showing many abnormal mental symptoms. A couple of days after his entrance into the hospital, he had an apoplectiform attack, with a left hemiplegia, the symptoms of which lasted less than 24 hours, and were followed by a wild excitement. The blood and spinal fluid gave positive Wassermann reactions; there were 75 cells per cmm., and a paretic gold sol reaction was obtained. Several months of semi-weekly injections of arsphenamine, of 0.6 gram each, resulted in symptomatic improvement of the patient, and at the end of three months his spinal fluid findings were negative. Five years have now elapsed since his return to the community, and he has had no recurrence of symptoms.

CASE 15. Therapeutic Results in General Paresis: The case of Jennie R. is somewhat similar. She was committed as a paretic. She was confused, emotionally unstable, and her memory was exceedingly poor. The blood and spinal fluid Wassermann reactions were positive; there were 80 cells per cmm.; globulin and albumin in excess. The pupils were stiff and unequal. The knee jerks were sluggish and the ankle jerks could not be obtained. A few months of treatment were sufficient to produce a negative spinal fluid, and now for almost five years the patient has been apparently entirely normal both physically and mentally.

These two cases with every appearance of paresis represent a very small minority of cases in which the results are fairly easily obtained and are markedly satisfactory. I would not, by any means, have it appear that this is the rule, but such cases can be multiplied.

CASE 16. Therapeutic Results in General Paresis: William B. was brought to the hospital following a convulsion. He was confused and apparently quite deteriorated. He was 53 years of age. The nuerological examination showed pin-point pupils which were rigid and irregular. Speech defect was present. Otherwise the physical examination was negative. The blood and spinal fluid Wassermann reactions were positive; there were 20 cells cmm.; albumin 3+, globulin 3+, and a paretic gold reaction. The patient was given intravenous injections of salvarsan twice a week in doses averaging 0.6 of a gram. Mercury was given intramuscularly at the same time, as well as potassium iodide. The spinal fluid was drained once or twice a week, as much being taken as would flow rapidly through the needle, averaging from 30 to 50 cc. This treatment was persisted in for 4½ months without cessation, and then reduced to one treatment a week. At the end of one year, the spinal fluid had become negative, but it should be noticed that it took an entire year to obtain this result, and more than 50 injections of arsphenamine. Symptomatic improvement was first obtained about three to four months after the institution of treatment. The patient is still continuing to receive treatment because his blood Wassermann is positive. He has had over 90 injections of arsphenamine. He has been working at his old position for over three years, and is apparently as vigorous and hardy, both physically and mentally, as a man of thirty.

The preceding three cases illustrate the very satisfactory results that may be obtained by intensive intravenous therapy in cases diagnosed as paresis. Many cases, something more than one-half, do not do well under this form of treatment, or, for that matter, under any type of treatment. I am not in a position to say whether or not intraspinous therapy is of any real value in the treatment of general paresis. I do believe, however, that it is indicated in those cases which do not improve under intravenous therapy. The drainage of the cerebrospinal fluid may be of value. On this point, however, I again am not in a position to state a definite opinion, but my general experience has not convinced me that it is of positive value. However, in those cases which do poorly under other forms of treatment, I believe that it is indicated.

Another addition in the treatment of paresis that has been advocated is the intraventricular injection of arsphenaminized serum. The procedure consists of making an opening in the skull in the frontal region, performing a ventricular puncture, and, after the withdrawal of the ventricular fluid, introducing serum into the ventricle. Theoretically the flow of cerebrospinal fluid is from the ventricles, through the brain substance, and through the foramina of Luschka and the foramen of Magenda, so that, theoretically, substances introduced into the ventricles tend to diffuse throughout the brain substance.

CASE 17. Therapeutic Success with Intraventricular Injections in General Paresis: Arthur F. was apparently a rapidly deteriorating paretic. He was apathetic, his memory was poor and his judgment bad. He had unequal, stiff pupils, a speech defect, and very lively tendon reflexes. The Wassermann reaction in both blood and spinal fluid was positive; there were 49 cells per cmm.; globulin 3+, albumin 3+; a paretic gold sol reaction: 5555553210. He was given intensive intravenous injections of salvarsan, with intramuscular injections of mercury, and potassium iodide by mouth. The spinal fluid was drained at weekly intervals, but despite these procedures, he apparently became worse and worse. Hence, at the end of over two months, it was decided to do a trephine and give intraventricular injections. This was done in June, 1916. Three injections were given and intravenous treatment continued. At the end of three months, after the three intraventricular injections, the patient had a negative spinal fluid and was apparently entirely well symptomatically. He was last seen in October, 1919, more than three years later. During this entire period he has been considered as normal mentally as well physically. He has been employed for more than a year driving an automobile delivery wagon, and aside from the physical signs, which are as before, the examination shows him to be in perfectly good condition.

I have had several such striking results in the use of intraventricular treatment. I would candidly say that the majority of cases which I have given intraventricular treatments have not been satisfactory. It is only fair to say, however, that the only cases on which I have used this method of treatment are those which have failed to react to any other treatment, and have practically all been very advanced cases. The results have, however, been striking enough in some cases to justify the procedure, especially when there is no other hope for the patient. The method is not particularly dangerous, and with special care should not be feared.

In a general way, it may be said that at least 25% of the paretics who have received intensive treatment of one form or another have had remissions of longer or shorter duration. Many have been well for a number of years. And, therefore, I believe it is possible to state that the prognosis of paresis is better when treatment is instituted than when it is not. In no particular case would I be willing to say that good results are to be expected, but rather make the general statement that there is a chance of satisfactory improvement,—and by satisfactory improvement is meant the ability of the patient to take his place in the community as a self-supporting individual,—and that this chance is about one in four, as contrasted with one in fifty when no treatment is given.

To summarize, then, the treatment that I am in the habit of advocating in paresis: Every patient except those in an advanced stage, should be treated. The treatment may be started by intravenous injections, given at least as frequently as twice a week. It is probably wise to give intramuscular injections of mercury and iodides at the same time. Either frequent drainage, or probably more satisfactorily, intraspinous injections of arsphenaminized serum may be given in addition. Those cases which do not do well under this treatment should be considered as possible candidates for intraventricular injections. I would like to call attention to the relative frequency and intensity of the treament given. Injections of arsphenamine twice a week over a period of months, and often over a period of many months, is often necessary to obtain results in paretic neurosyphilis. Let us bear in mind that in the treatment of syphilis, even when begun in the early stages, many months, or probably many years, are necessary to sterilize the patient. In an involvement of the central nervous system, into which the penetration of drugs is much less easy, we should certainly not expect quicker results. On the contrary, more treatment will necessarily be required.

In my experience, the cases of meningitis and acute meningomyelitis will react very favorably to the intensive or frequently repeated injections. In the parenchymatous types, tabes and paresis, for example, many months, or often years, are required to obtain results that we may consider satisfactory. Optimism and perseverance are essential, both from the patient and the physician. The problem of neurosyphilis is essentially different from the problem of dermatological syphilis. In the latter, the weeks or months are of no consequence, or very little consequence. A mucous patch is unpleasant; it is infectious and may lead to leukoplacia or carcinoma, but not rapidly. Hence, time is not a very essential factor. In neurosyphilis, the damage being done affects a most important portion of the body, and if unchecked will lead to incapacity, insanity, and death. Hence, in treating neurosyphilis, we are confronted with the necessity of obtaining therapeutic results in order to avoid those consequences. It therefore behooves us to work as rapidly and efficiently as possible. We can take a greater risk of the possibility of damage to the kidneys or liver as a result of treatment than we would care to take when the disease has affected only the more unimportant organs.

Spinal Fluid Findings in the Differentiation of Paretic and Non-Paretic Neurosyphilis.

It is often very difficult, and at times quite impossible, from the clinical picture alone to make a correct differential diagnosis between general paresis and cerebrospinal syphilis. While there are a number of definite rules by which one may be guided, there are so many exceptions to the rules that we are frequently confronted with a case in which it is impossible to say whether the process is one of a

	W. R. Blood	W. R., C. S. F.							Globulin	Albumin	Cells per cmm.	Gold Sol.
		1.0 c.c.	0.8 c.c.	0.6 c.c.	0.4 c.c.	0.2 c.c.	0.1 c.c.	0.05 c.c.				
I. G. P.	+95%	+100%	+100%	+100%	+100%	+95%	+90%	+80%	+	+	1-200	555542100
	—5%	...	...	...	...						Average 25-50 Plasma cells characteristic.	
II. C. S. S. (Pure vascular type excepted.)	+60%	+	+	+	+	+	+	+	+	+	1-2000	0134420000
	—40%	100%	90%	80%	70%	60%	40%	10%			Average 5-200	
III. Tabes ("Burned-out" type excepted.)	+60%	+	+	+	+	+	+	+	+	+	1-200	
	—40%	100%	90%	80%	70%	60%	40%	10%			Average 25-50	0123320000

Formula I may occur in C. S. S. or tabes.
Formula II or III practically rules out G. P.

parenchymatous degeneration, *i.e.*, general paresis, or a diffuse meningovascular involvement, *i.e.*, cerebrospinal syphilis. The examination of the cerebrospinal fluid will give a very important differential finding in this regard in quite a number, if not the majority, of the cases. The accompanying chart illustrates this fact. The Wassermann reaction in the spinal fluid is always very strongly positive in cases of general paresis, that is, if we use but small quantities of spinal fluid, the reaction will still give a very strongly positive result. This is not always the case, however, with cerebrospinal syphilis. As ordinarily performed in the majority of laboratories, the Wassermann test is made using 1 c.c. of spinal fluid. In this case it is practically always positive in general paresis, cerebrospinal syphilis, and tabes. However, if one titrates the fluid, using 1 c.c., 0.8 c.c., 0.6 c.c., 0.4 c.c., 0.2 c.c., 0.1 c.c., and 0.05 c.c., it is found that while general paresis gives a strongly positive reaction in the vast majority of cases with 0.1 and 0.05 c.c., cerebrospinal syphilis and tabes give a positive reaction in these dilutions in only a very small percentage of the cases. Another differential point is obtained by the use of Lange's gold sol test. The cases of general paresis almost without exception give a reaction which has been spoken of in the literature as the "paretic reaction." This may be indicated by the following figures 5555421000. Many, if not the majority of cases of cerebrospinal syphilis and tabes give a much more mild reaction to this gold sol test. The formula that may be given as the frequent finding is 0134420000. It is found occasionally that the cerebrospinal syphilis and tabes cases will give a so-called paretic type of gold sol reaction. If, however, we find the mild gold sol reaction, it is very good presumptive evidence that the case is not one of general paresis; and if, in addition, we find that the Wassermann reaction is negative in 0.2 or 0.4 of a c.c., although positive in the lower dilutions, it becomes very highly probable that the case is not one of general paresis. The cases 9 (James S.) and 10 (Frank M.) are illustrations of this fact, although from the mental and physical findings it was not possible to say whether we were dealing with paresis or cerebrospinal syphilis. The fact that the findings of the Wassermann reaction in the spinal fluid, and the gold sol reaction were milder than would occur had the cases been paretic in type satisfied us that each case was one of cerebrospinal syphilis and not of general paresis. It was possible, upon the beginning of treatment, to offer a fairly satisfactory prognosis to the patients, and this prognosis was borne out by the subsequent course of the cases under treatment.

Indications for Lumbar Puncture.

From the point of view of the neuropsychiatrist, certain rules may be promulgated as to the use of lumbar puncture. These which follow are somewhat similar to those given by Ravaut:

1. Cases of early syphilis showing symptoms indicative of central nervous system involvement, namely: headaches, dizziness, ocular and aural symptoms, should have a lumbar puncture.
2. All cases seen after the early secondary stage that are not to receive most intensive treatment.
3. All cases treated from the primary or early secondary stage which do not give a negative Wassermann reaction in the expected time.
4. All cases showing mental or nervous symptoms, irrespective of the blood Wassermann reaction. This is based upon the fact that many cases of tabes, cerebrospinal syphilis, gumma, and even paresis, give negative blood Wassermanns.

In conclusion, it may be pointed out that:

1. The central nervous system is involved by syphilis very frequently in the primary and secondary stages; that this involvement is ordinarily benign and disappears symptomatically with or without treatment.
2. In a small number of cases, acute meningitis, meningoencephalitis, vascularitis, and gummas occur in the secondary period of the disease.
3. About 10% of all cases of syphilis develop late neurosyphilis, tabes, paresis, meningitis, meningoencephalitis, gummas, vascularitis.
4. Neurosyphilis is always serious, affecting the mind, utility, and life of the patient.
5. Diagnosis is often only possible by the aid of the spinal examination.
6. Therapeutic results are better, the earlier the diagnosis of syphilis is made, and the sooner treatment is instituted.

7. The spinal fluid is often positive long before definite symptoms are present; hence the need of frequent lumbar punctures.

8. More intensive treatment is usually required to treat neurosyphilis than in the treatment of non-nervous-system syphilis.

9. Cases of meningitis, acute meningoencephalitis, and mild vascular syphilis usually react favorably to intensive intravenous injec-

10. For these conditions intraspinous injections will at times accomplish more than intravenous therapy.

11. Tabes is more difficult to improve than the above mentioned forms. Many causes, especially the early ones, show improvement under intravenous therapy adequately administered, but with intraspinous therapy will frequently do much better. It is often the method par excellence.

12. Many cases diagnosed as paresis make fair recoveries under intravenous therapy.

13. Intraspinous injections and drainage of the cerebrospinal fluid may aid in the intravenous treatment of general paresis.

14. Intraventricular injections may at times give more favorable results than any other in the treatment of paresis.

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REMARKS ON THE TREATMENT OF FRACTURE OF THE NECK OF THE FEMUR, INTRODUCING A LANTERN-SLIDE DEMONSTRATION OF THE ABDUCTION METHOD AND ITS RESULTS.[*]

By Royal Whitman, M.D., New York City.

These introductory remarks are designed to emphasize the distinction in method and purpose between the abduction treatment and conventional practice.

Fracture of the neck of the femur, by the abduction method, in the great majority of cases, may be treated like other fractures, with the aim of restoring function, and relatively speaking, with the same prospect of success.

Conventional treatment is mechanically inadequate to assure the essentials of functional repair, and both the rules of practise and the conclusions that support them are based upon this inadequacy. The extraordinarily bad results that distinguish this particular fracture from all others are due primarily to bad treatment. For contrary to the prevailing belief, and because of the mechanical and nutritive obstacles to repair, the outcome is more directly determined by the quality of the treatment than is that of any other fracture.

The typical fracture of the hip is of the central or intracapsular type. The fragments are of small area, lying in a lateral relation. The circulation is impaired by the injury and repair is unaided by external callus. The essentials for union are accurate end to end apposition, and the security that can be maintained only by mutual pressure of the fractured surfaces. The mechanical inadequacy of conventional methods to assure these essentials is apparent on analysis, and it has been practically demonstrated by the results.

In fractures at the base of the neck, the conditions are far more favorable. Yet no attempt is made to correct the deformity which must inevitably impair function. Indeed if the fracture is supposed to be impacted it must on no account be disturbed since such accidental fixation is the only assurance of union.

The initial inadequacy of conventional treatment is further emphasized by the perfunctory manner in which it is conducted and by the disregard of after care. For although repair is particularly slow and the neck of the femur subjected to great strain, patients are encouraged in weight bearing within a few weeks after active treatment has been discontinued.

Perfunctory treatment, which has been aptly characterized as a surgical ritual, is best exemplified in hospitals, which are supposed to set the standard of efficiency. As to practice at large, it is stated that of 120 cases of ununited fracture at the hip observed at the Mayo clinic, not one had been efficiently treated at the time of injury.[1]

The results are so extraordnarily bad, that paradoxical as it may seem, they are the chief support of the treatment that produced them because they are accepted as evidence that the outcome is practically determined by the situation and character of the injury, whether intra- or extracapsular, loose or impacted, and by the physical condition of the patient, rather than by surgical skill and efficiency.

A large proportion of the patients are aged and infirm, consequently the treatment of the patient rather than the injury always receives the first consideration in the text books. As a matter of fact, however, all patients receive the same treatment. It may vary in quantity but the quality is the same for old and young: The standard of success is union of the fragments without regard to the range of joint motion or to the quality of the gait. Function, in the words of an authority, "is forever impaired, no matter whether the fracture has taken place within or external to the capsule, whether it has united by ligament or bone, shortening of the limb and lameness are the inevitable results."

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[*] Presented at a meeting of the Springfield Academy of Medicine, September 14, 1920.

This analysis is presented in support of the statement that the rules, precepts and standards of conventional practice are based upon the mechanical inadequacy of the methods hitherto at command to apply the surgical principles that govern the treatment of all other fractures, and that the results demonstrate primarily inadequate treatment rather than inadequate capacity for repair.

It is important to establish this proposition, because the question at issue is not of the relative superiority of the abduction method in providing the opportunity for repair since this is physically demonstrable. It is whether efficient treatment is worth while, in other words, whether the result is determined primarily by chance or by surgical intervention.

The second stage of the abduction treatment preparatory to the application of the plaster spica. The shortening having been reduced by direct manual traction, the limbs are then abducted to the normal limit, as demonstrated on the sound side. The limb on the injured side is completely abducted, extended, and slightly rotated outward. The surgeon supports the trochanter and notes the exact correspondence of landmarks on the two sides of the level pelvis. The Hawley table is a convenient support, but the traction apparatus is not used.

The abduction method is a treatment for fracture of the neck of the femur and these remarks apply, therefore, to what may be termed operable cases. Experience has proved, however, that a treatment that relieves pain, that permits change of posture, and thus prevents bed sores, and hypostatic congestion, has a far wider range of practicability than any method that confines the patient to the back, and that it is often more conservative even than non-treatment. Furthermore, that advanced age does not prevent repair.

In the application of the abduction treatment, no distinction is made between the intra- and extracapsular fractures, except that the result in the former instance is considered absolutely dependent upon favorable opportunity and therefore on the quality of the treatment. Deformity that must interfere with function is always corrected and it has been demonstrated that the so-called impactions in most instances are not stable in the sense of assuring repair, but that the fractured surfaces are displaced. Consequently that the correction of deformity which is essential to normal function is also essential to union.

The abduction treatment, because it is in accord with surgical principles, is applied with a definite purpose, the accomplishment of which may be demonstrated by x-ray examination at the time of the operation and at intervals thereafter. Furthermore, in contrast with all other methods, it is completely under the control of the one who applies it. Finally, it is supplemented by a protective and reconstructive treatment during a period of from six months to a year, to assure as far as may be the restoration of function.

As practical evidence in support of the propositions that have been advanced, two reports may be cited: that of the British Committee on Fractures in which the satisfactory results were 23% of the cases actually treated and that of Campbell (*Annals of Surgery*, Nov., 1919), of a practically equal number of cases of the same quality and type, treated by the abduction method with 94% of favorable results, *i.e.*, bony union and good function. It is further stated that, "Quite a number of these walked perfectly"—a balance of 70% in favor of efficiency.

In the past, inefficiency, incompetence and neglect have been tolerated because of the belief that efficient treatment of the fracture was dangerous or impracticable or futile.

When, however, the self-evident proposition, that repair is dependent upon opportunity, is accepted, the only method that will assure demonstrable opportunity must become the basic routine of treatment, because the surgeon who selects and applies methods, manifestly inadequate to provide the first essential of success may then be held responsible for failure.

REFERENCES.

[1]Henderson: Surg., Gyn. and Obstet., January, 1920.

SPINA BIFIDA: OPERABILITY AND TIME FOR SURGICAL INTERVENTION.*

By Torr Wagner Harmer, M.D., Boston.

Spina bifida is, as you know, a developmental defect, a defect in closure of the spinal column. The defect may be anterior or posterior. I shall speak only of the posterior types. In these, the spinous process and parts of the laminae of one or more vertebrae may be missing. There may or may not be a protrusion of dura through this defect. When a protrusion exists, it may be pedunculated or rounded and sessile. Whether or not a protrusion exists, the bony defect may be covered with skin, skin and membrane, or entirely with membrane. Nerve elements may or may not be present in the sac, and when present they may or may not be adherent. Paralysis of varying extent according to the level of the defect and the nerve involvement may be present. There may be complete sensory and motor paralysis below the level of the lesion, including the bladder and rectum.

This series now includes 38 cases, personally operated, which I believe is an unusual experience. The earliest cases are now nearly five years old. There are eight meningocoeles, 26 myelomeningocoeles, 3 hydroencephalocoeles, and 1 encephalocoele. Twenty-seven were rounded and sessile, 8 rounded and pedunculated, and three flat and entirely covered with membrane. Twenty-two cases had ulcerated or leaking sacs.

Seventeen cases were discharged dead, twenty-one were discharged alive; a mortality of 44.7 per cent., which compares very favorably with other percentage figures which I have found. The causes of death were meningitis, continued loss of cerebro-spinal fluid, acute hydrocephalus, shock, and umbilical septicaemia. Therefore, deducting the case which died of umbilical septicaemia, the operative mortality is 42.1 per cent.

In June, 1917, I had the privilege of presenting a paper on this subject before the Massachusetts Medical Society. In this paper (Boston Medical and Surgical Journal, September 13, 1917) was presented an analysis of the cases to date, and my technique of operating. In this short talk I wish to consider only the operability of cases and time for surgical intervention. Protrusion through the bony defect depends on a disturbance in the relation between secretion and absorption of the cerebro-spinal fluid. The bulging sac acts then as a safety valve. In cases in which the sac is an inadequate safety valve, hydrocephalus will ensue. Likewise, if the sac be removed before an equilibrium between secretion and absorption of cerebro-spinal fluid has been established, an acute hydrocephalus will occur. Death without operation may occur from two causes,—from compression, or from meningitis in those cases in which the membraneous coverings of the sacs become excoriated and infected.

Now for the various types of cases. First, those with sacs entirely covered with skin, without paralysis. In these, obviously operation may be deferred until it is evident that no hydrocephalus is developing. In such cases in which the sac is increasing in size, it is obviously better judgment to wait until the sac has apparently reached its maximum, *i.e.,* until several weeks have elapsed with no change in the size of the sac. In the pedunculated variety entirely covered with skin, operation may be deferred for a longer time, because there is little likelihood of the inclusion of nerve elements. In the sessile type, there may be inclusion of nerve elements and operation should not be deferred longer than is necessary to determine the unlikelihood of post-operative hydrocephalus.

Second, those cases with rounded sacs covered partially or entirely with membrane. In cases of this kind it is obviously wisest to operate as soon as possible on account of the great danger of excoriation and infection of the sac. Even if this has occurred, operation may be successfully performed, but the risk of post-operative meningitis is obviously greatly increased. In cases of this type with paralysis, I believe that operation should be performed at once, *i.e.,* as soon as the little patient can be transported to surroundings where surgical interference can be safely made,—within three, four or five hours after birth. In such cases, granulation at the summit of the sac is prone to occur and the nerves very soon become inextricably involved in this granulation. Operation should be undertaken before this calamity has occurred. Otherwise operation cannot cure the paralysis. In cases of this type (sacs partially or entirely covered with membrane) in which there is evidence of hydrocephalus, immediate operation to forestall an infection of the sac may be followed by rapid development of hydrocephalus. Under such circumstances, with scrupulous care of the sac to prevent infection, a delay of a few days is justifiable. If the sac is increasing in size and operation is performed, hydrocephalus will surely ensue. If the sac does not increase in size and the head does not change, operation is justifiable on the grounds that an equilibrium between secretion and absorption of cerebrospinal fluid has been established. I have operated on cases of this kind and no increase in the hydrocephalus has occurred. Operation can certainly not be long delayed because the membrane will inevitably become infected.

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* Read before the Suffolk District Medical Society, November 17, 1920.

Third, those cases without protrusion but with the defect covered entirely by flattened membrane. If the defect is a wide one, if the membrane is excoriated, and if there is paralysis, I regard the case as inoperable. None of this external membranous covering can be used to close the dura, *i.e.*, infolded under mobilized skin flaps. Infection inevitably occurs. The external membrane must be entirely removed. In cases with wide defects, it is obvious that even by stripping the dura from the surfaces of the stumps of the laminae, sufficient dura cannot be obtained to close over the cord or cauda equina. Under such conditions leakage of cerebro-spinal fluid itself may cause death, or cerebro-spinal meningitis will develop. In cases of this type, therefore, in which the sacs are already excoriated and paralysis is present, operation is not justifiable. On the other hand, however, if the membrane is intact, if there is no paralysis and no indication of hydrocephalus, operation is hazardous because it may be impossible to mobilize a sufficient amount of dura to tightly close the sub-dural space. Operation, nevertheless, is justifiable because sufficient dura may be mobilized and because death from meningitis is inevitable without operation.

To recapitulate:

1. Rounded pedunculated sacs, entirely covered with skin, without paralysis—operation may be safely deferred for a long time, but it is better judgment to adopt the same criterion for operative interference as in the rounded sessile type.

2. Rounded sessile sacs, entirely covered with skin, without paralysis—operation should not be deferred longer than is necessary to determine that an equilibrium between secretion and absorption of cerebro-spinal fluid has been established, *i.e.*, not longer than several weeks after the sac has reached its maximum size.

3. Rounded sessile sacs, entirely covered with skin, with paralysis—operation at once in the hope of forestalling inextricable adhesion of nerve elements. Post-operative hydrocephalus may occur but if we wait for signs of hydrocephalus to appear, we will likely miss the opportunity to cure paralysis by operation. Non-adherent nerve elements in the sac may be successfully replaced within the spinal canal, but nerve elements involved in granulation tissue of the sac cannot be successfully extricated.

4. Rounded sessile sacs, entirely or partly covered with membrane, without paralysis. With scrupulous care of the sac, a delay of a few days is justifiable to demonstrate the unlikelihood of postoperative hydrocephalus. Delay beyond this means excoriation and infection of the sac and poorer operative prognosis.

5. Rounded sessile sacs partially or entirely covered with membrane, with paralysis—operation at once, in the hope of finding nerve elements which are not inextricably adherent to the sac. With the head obviously hydrocephalic, operation is not justifiable.

6. Defects covered entirely with flat membrane, when narrow and with or without paralysis—operation at once.

7. Sacs entirely covered with flat membrane, when wide and with paralysis—operation unjustifiable.

My hope in this short talk is to dispel a very general belief that operation should be postponed until the child is stronger. If I have made it evident in this talk that postponement in certain cases loses the opportunity for successful surgery, I have accomplished my purpose.

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THE CUTTER LECTURE ON PREVENTIVE MEDICINE AND HYGIENE.—The Cutter Lecture on Preventive Medicine and Hygiene was delivered by Professor Jules Bordet, Director of the Pasteur Institute at Brussels, on "Anaphylaxis," on Monday, Nov. 15, 1920, at the Harvard Medical School.

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THE PRESENT DAY PLIGHT OF PETROGRAD PHYSICIANS.

THE *British Medical Journal* for July 31, 1920, quoting the*Tidshrift for den Norske Laegeforening* of June 15, 1920, gives a gloomy picture of the desperate strait to which the practitioners of Petrograd are reduced.

During the recent typhus epidemic in Petrograd, the mortality among physicians attending these cases was between 45% and 50%, while the mortality for the whole city was between 8% and 9%.

All physicians have been nationalized and are government employees, not being allowed to engage in private practice. The official monthly wage is between 5,000 and 6,000 rubles, plus a double food ration, which includes one-half pound of bread a day. The physicians have one public meal a day, which consists of soup and horse meat. On this diet they have carried out their onerous duties, which have increased greatly by reason of epidemics of cholera and dysentery in the summer and smallpox and typhus in the winter.

Of the 4,000 physicians resident before the war only 800 are left, most of the rest have died of starvation, over-work, or have been victims of the various epidemics. Their work is usually done on foot, the trams being so infested with lice that their use entails great danger of contracting typhus. The cost of a horse and vehicle is 2,000 rubles an hour, and the few motor cars left cannot be used by physicians.

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VITAMINES.

THE question was asked by a reader of the editorial on vitamines in the issue of Oct. 28, 1920: "How do the Eskimos get vitamines? We requested an answer of Prof. E. V. McCollum of Johns Hopkins, and have received the following reply:

Mr. Editor:

Replying to your letter regarding the Eskimo: The Eskimo had a pretty satisfactory diet in his primitive state, because he ate not only muscle meats but likewise glandular organs which supplied the various unidentified dietary essentials; blood which supplied the necessary sodium chloride, which would not have been sufficiently abundant in muscle tissue; bone marrow, which likewise supplemented the unidentified dietary factors, of which he got a portion in the glandular organs; the soft ends of bones, which pieced out the calcium supply. He was able to derive a large supply of his energy supply from fat, and with this selection he succeeded admirably with his nutrition. This is the type of selection which carnivorous animals usually make and on which they develop well if their hygienic conditions are satisfactory.

Yours sincerely,
E. V. MCCOLLUM.

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MALPRACTICE DEFENSE.

LAST June the Maine Medical Association adopted an act defending its members against suits for malpractice, thus becoming the twenty-seventh state medical society in the Union having such defense and at the same time paying a compliment to the medical society of its sister state, Massachusetts, by adopting the measure that, with one or two minor additions, has been in successful operation in this Commonwealth for the past twelve years.

In general terms, the act of the Massachusetts Medical Society, which, by the way, was drawn by the late E. B. Harvey and put into operation during the presidency of G. W. Gay, provides for defense of any active member in good standing, in any court in the Commonwealth when he is sued for malpractice, without expense to him, provided he agrees to put his case unreservedly in charge of the attorney supplied by the Society and also agrees not to settle the case without the Society's consent. The president and secretary are a board to determine what cases shall be accepted for defense. Should a case in court be lost, the Society furnishes nothing toward the payment of any damages that may be awarded. The last provision, which is general among malpractice acts of the several state medical societies, deters many of the prominent men in the profession, those with large practices and large incomes, from trusting to the medical society for defence; as a rule, these fellows carry commercial insurance, seldom asking the Society for its help. Therefore most of the actual defense is given to men of minor prominence and those who have no insurance.

It may be stated without fear of contradiction that the act has given general satisfaction and has afforded protection to a large number of fellows since 1908. In only two cases during that time have adverse verdicts been found and both of these have been appealed on points of law. The expense to the Society of defending its members has not been excessive—from five to six hundred dollars a year. The experience in Massachusetts has been the same as in a majority of states where a malpractice act has been in operation. Dr. J. A. Spaulding of Portland, who was responsible for the passage of the Maine act, carried on an extensive correspondence with the other states and summarized the results in the *Journal of the Maine Medical Association* for April, 1920. Malpractice suits are increasing in frequency as the years pass. The lawyers who hope to get a large share of any money extracted from a physician's pocket are even hungrier and more adroit in using the technicalities of the law for their own profit. The plaintiff plays the part of stool pigeon so far as receiving any considerable part of damages assessed. A suit may be instituted on the very flimsiest of pretexts and it must be defended.

Not to pay damages that may be awarded is an essential principle for any state medical society to incorporate in its act for defense, for in this way is removed the incentive to bring suit. Whenever application papers have been filed with the Society following the receipt by a fellow of a threatening lawyer's letter, the matter has been dropped by the plaintiff's attorney in nine out of ten instances. There is no money to be obtained from the medical society. On the other hand, there might be, and generally is, a prospect of a fee from an insurance company, in the way of settlement if not in satisfaction of a verdict for the plaintiff. In this manner commercial insurance fosters the bringing of suits. There have been instances where a physician has been careless, like certain members of all professions, and has failed to give his patient reasonable and customary treatment. In such cases he has been advised to make a settlement with the objecting patient rather than fight a suit, on the ground that it is proper for him to pay for his inattention. This happening is not of common occurrence.

Among the moot points that have arisen during the operation of the act is the question whether there can be conceived any arrangement by which fellows may obtain both defense by their society and, in addition, reimbursement in the event of damages being awarded. The California Medical Society has a plan called "inter-indemnifying." Members who desire to participate pay a preliminary assessment of thirty dollars each. That society gives the following advice to its members: "Considering the very slight cost, members should not waste any effort to determine whether defense by the society without indemnity or defence by the society with indemnity or defense by an insurance company is superior, but should impartially and promptly secure all protection available." The distinction is drawn between indemnity and insurance and the claim is made that California does not insure. Another question often asked is: "How can a private attorney retained by a fellow to protect his interests, be assisted by the attorney for the society?" Thus far no procedure has been devised whereby the Society's attorney may act for a fellow through his attorney or through the lawyer for an insurance company. In order to defend successfully it seems to be necessary for the Society and its agent to have entire charge of all the details; a division of responsibility is to be avoided, according to legal advice.

Under the law, the physician cannot be relieved of the accountability which attaches to the practice of his art, no matter if he was doing an act of charity, supplying for a brother practitioner or was a member of a public hospital staff, where much of the actual treatment of the patients was done by assistants. The responsibility for giving a patient the care that is generally regarded as reaching the average of efficiency in a given community is his and cannot be transferred to anyone. Therefore, it is incumbent on him to control the acts of his assistants. At the present time it is a question whether a surgeon can afford to be a member of a public hospital staff unless he can give the time necessary to supervise the detail work of his assistants, for there are few operations that may not be made the basis of a suit, and public hospitals cannot be sued.

Another question which arises is, "What are the duties of a relatively small group of Fellows who are qualified to act as experts in court, toward suits that are defended by insurance companies?" In the experience of the Massachusetts Medical Society, these experts have given freely of their time and knowledge without remuneration, in testifying in suits against their brethren when defended by the Society. Their service is to be compared with that rendered in a professional way to the members of their own profession and to the families of members. Should they give of their time and experience without pay to the defense of suits cared for by insurance companies? The companies complain of the cost of expert testimony; they say they are doing their best to protect the profession, consequently the experts should furnish their policy holders the same service they give the fellows of the Society. To this it is answered that the companies are insuring in order to make money while the Society has no such object in view. Were all the members of the Society equally available as experts, the solution of the difficulty would be plainer. Today most of the experts pay for commercial insurance for themselves and look to the insurance companies for defense. They are the ones who most often are singled out as victims by the acquisitive lawyer, for do they not possess property, and high standing, which is capable of being transposed into terms of money?

Lack of interest in malpractice defence, except among those who have suffered, is too prevalent in the medical profession. The thoughtful physician might well devote a portion of his leisure moments to consideration of the problems that confront us; to assist in determining the best methods of protecting the profession of medicine from unjust attacks.

A CORRECTION.

The writer of the editorial on Maternity Aid in the Journal of August 5, 1920, wishes to state that eight deaths should have been added to the list of out-patients who died as a result of pregnancy and labor during a fifteen-year period. This would make a mortality rate of 14, instead of 11, per 10,000 births as compared with a rate for the State of 38 in 1901 and 84 in 1918. The error was made through misinformation.

MEDICAL NOTES.

BOSTON AND MASSACHUSETTS.

Week's Death Rate in Boston.—During the week ending December 18, 1920, the number of deaths reported was 208 against 210 last year, with a rate of 14.50 against 13.75 last year. There were 35 deaths under one year of age against 32 last year.

The number of cases of principal reportable diseases were: Diphtheria, 72; scarlet fever, 38; measles, 34; whooping cough, 31; typhoid fever, 1; tuberculosis, 44.

Included in the above were the following cases of non-residents: Diphtheria, 12; scarlet fever, 8; measles, 1; tuberculosis, 5.

Total deaths from these diseases were: Diphtheria, 7; whooping cough, 3; tuberculosis, 13.

Included in the above were the following cases of non-residents: Diphtheria, 3; tuberculosis, 1.

Graduating Exercises at the Peter Bent Brigham Hospital.—The graduating exercises of the School for Nursing of the Peter Bent Brigham Hospital were held at the hospital on the evening of December 3. The exercises were followed by a reception.

Correspondence.

MATERNITY AID: A REJOINDER.

Mr. Editor:—

In the Journal of December 9 was published a brief submitted to the Senate Committee on Ways and Means before the adjournment of the Legislature last Spring. Without intending to enter into any discussion regarding the opinions expressed in the brief, I wish to call attention to certain misstatements of fact.

The article states that "It is safe to say that not 50% of the physicians have an intelligent knowledge of these bills, and the reason is obvious because these bills have not generally been put before them for consideration."

In the Journal of January 29, 1920, pp. 121-123, is an editorial article signed by Dr. Alfred Worcester, President of the Massachusetts Medical Society, dealing with maternity benefits and printing the Young Bill in full. In the same issue, page 132, is a brief explanation of the Young Bill and the attitude of the Joint Committee at the opening of the legislative session.

On March 11, 1920, pp. 285, 286, in a report by the Joint Committee, a full explanation of the Spencer Bill, the Carey Bill, and the Young Bill is given. In the same issue, the Journal commented editorially (pp. 279, 280) on maternity benefits.

On May 6, 1920, pp. 491, 492, a report was made by the Joint Committee on various matters before the Legislature, including maternity aid, and giving the draft of a new bill, reported on April 23, by the Committees on Public Health and Social Welfare, sitting jointly.

In the issue of May 13, 1920, p. 509, the Journal made editorial comment on this report, stating that "if we hope to influence legislation we must inform ourselves more fully and diffuse our views more widely."

On June 24, 1920, p. 664, after the adjournment of the Legislature, the Journal appealed editorially for full and free discussion of maternity aid.

The Journal is sent to every member of the Massachusetts Medical Society who has paid his dues promptly.

The brief further says: "Before the Joint Committee, at previous hearings . . . it was said that the Massachusetts Medical Society and its 3,800 physicians were in favor of these bills. This is not so. The Legislative Committee of the Massachusetts Medical Society, we are told, endorsed these bills. . . . Therefore, when a speaker before the Joint Committee said he represented the 3,800 members of the Massachusetts Medical Society, all in favor of the bills, that statement could not have been correct."

As the representative of the Joint Committee on State and National Legislation representing the Massachusetts Medical Society and the Massachusetts Homeopathic Medical Society, and pursuing the instructions of that Committee, I stated before the Legislative Committees on Public Health and Social Welfare, sitting jointly, that, owing to wide diversity of opinion among physicians, we did not take any stand on the general social question of the advisability of maternity aid, but that if the Legislature determined to enact any of the proposed measures, the so-called Spencer Bill and the so-called Young Bill then being measures under serious consideration, the Committee strongly preferred the Young Bill.

The Joint Committee endeavors to present information to the members of the Society, to call forth discussion and, so far as possible, to represent the views of the Society.

James S. Stone, *Secretary*,
Committee on State and National Legislation.

MATERNITY AID.

Boston, December 18, 1920.

Mr. Editor:—

At the regular monthly meeting of the South Boston Medical Society it was voted that our Society endorse the views of Dr. A. H. Quessey regarding The Maternity Bill published in your last week's Journal.

Respectfully yours,
F. G. Miniter, *Secretary*.

MATERNITY AID.

Shelburne Falls, Mass., December 13, 1920.

Mr. Editor:—

In your issue of December 9 appeared an article on Maternity Aid by A. H. Quessey, M.D.

I wish to voice my absolute approval of the views therein expressed and to state that most, if not all, of my medical associates in this section have the same feeling about the proposed legislation; also to suggest, if I may, that it might be wise for the editors of the Journal to first find out the attitude of the rank and file of the profession in this state before editorially strenuously advocating any proposed new medical legislation. At least, this course would make for a more united profession and more hearty backing for the Journal.

Very truly,
Charles L. Upton, M.D.

SOCIETY NOTICE.

Essex North District Medical Society.—A semi-annual meeting of this Society will be held at Unity Hall, Main street, opposite City Hall Park, Haverhill, on Wednesday, January 5, 1921, at noon.

PROGRAM.

C. K. Drinker, M.D., of Boston, Associate Professor of Applied Physiology at Harvard University Medical School, "Opportunities in Industrial Medicine" (40 minutes).

F. H. Dunbar, M.D., of Boston, Bacteriologist, Instructor in Bacteriology and Pathology, Tufts College Medical School, "The Practitioner and the Laboratory" (40 minutes).

Alfred Worcester, M.D., of Waltham, President of the Massachusetts Medical Society, will be present as our guest, and will address the Society.

Upon invitation of the State Society, the next Annual Session of the American Medical Association will be held in Boston, June 6 to 10, 1921.

D. D. Murphy, M.D., *President*,
J. Forrest Burnham, M.D., *Secretary*.

NOTICE.

Massachusetts General Hospital.—Program of clinical meetings of the staff to be held in the Lower Out-Patient Amphitheatre, at 8 p.m., during the year 1921:

Jan. 10. Mediastinitis, Dr. Paul White and Dr. Ross Golden.
Jan. 24. Neurological Surgery, Dr. W. J. Mixter and Dr. G. Clymer.
Feb. 14. Respiration, Dr. F. B. Talbot, and Dr. J. H. Means.
Feb. 28. Blood, Dr. G. R. Minot.
Mar. 14. Cardiac, Dr. Paul White.
Mar. 28. Surgical—Carcinoma.
April 11. Neurological subject.
April 25. The Adrenals, Dr. J. C. Aub.
May 9. X-ray subject.

The above program is tentative and may be subject to change both in subject and speaker. The usual notice for each meeting will be sent a few days in advance.

F. A. Washburn, M.D.,
Resident Physician.